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PRODUCTIVE POTENTIAL OF SITES IN THE PINYON-JUNIPER TYPE

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PRODUCTIVE POTENTIAL OF SITES IN THE PINYON-JUNIPER TYPE

ESTABLISHMENT AND PROGRESS REPORT

by

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BACKGROUND INFORMATION

THE PROBLEM

Determination of productive potential of various sites in the pinyon-juniper type is needed for range management practices, for determining which sites should have high priority for research work, and for reliable extension of research results to other locations. Need for a site classification is recognized as a high priority problem in the project analysis (Jameson 1957).

The area treated by the end of 1967 was probably near 2,000,000 acres in Arizona alone. Except for the work of Arnold in a limited number of situations, there is very little basis for estimating the production that can be expected following juniper control.

A great many factors have a bearing on productivity of a site. Probably the most important of these are:

Climatic:

- Amount and distribution of precipitation
- Temperature

Edaphic:

- Infiltration and water-holding capacity of the soil
- Availability of macro and micro soil nutrients
- Rock content of the soil
- Slope
- Salinity and other antagonistic effects

PRESENT INFORMATION

Climate

Precipitation in the Flagstaff area generally comes from storms from the Pacific Ocean during the winter months, and from the Gulf of Mexico during the summer. The seasonal distribution of precipitation varies from summer dry areas in northern and western Arizona to winter dry areas in east-central Arizona and western New Mexico (fig. 1).[1/] Central Arizona receives the most precipitation in the Flagstaff area, since it receives the full effect of both summer and winter storms. In general, precipitation increases with both elevation and abruptness in topography. Thus the gently sloping areas bordering the northern Arizona plains are generally dry, while the areas along the Mogollon Rim are generally moist.

Moving from south to north in the Flagstaff area, the pinyon-juniper type becomes higher and drier. The elevations of the lower limits of the type are shown in figure 2. In the northeast corner of Arizona, the pinyon-juniper type does not usually appear below 6,500 feet, while in the western and central part of the State the type occurs down to 5,000 feet.

Combining temperature (as indicated by elevation) and precipitation distribution, the pinyon-juniper type can be divided into five broad climatic zones (fig. 3). These zones are characterized as follows:

1/ Copies of figures 1-4 are given in color in the study plan.

Pages 2a, 2b, 2c follow.

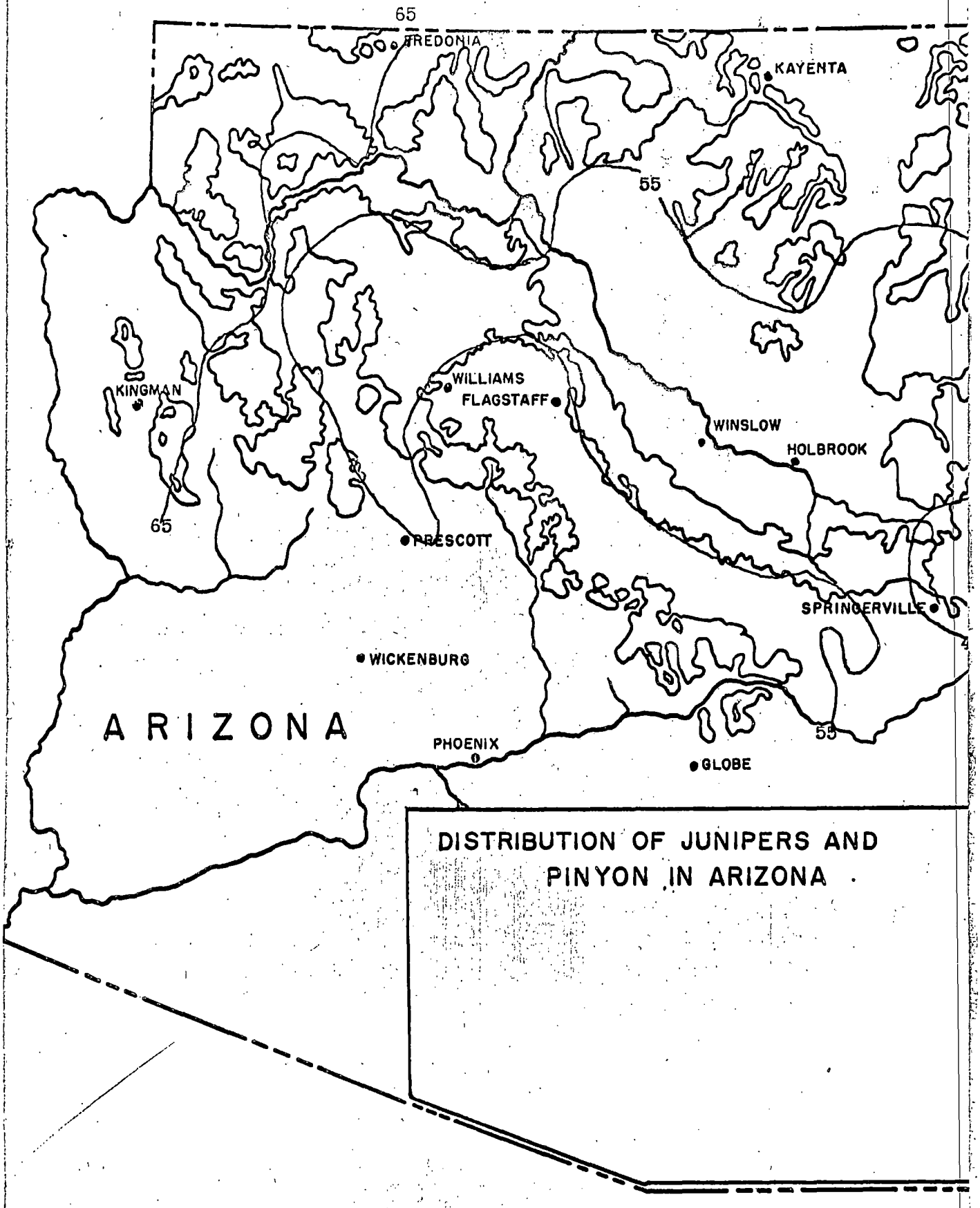


Figure 1.--Percentage of precipitation occurring in winter.

Figure 2.--Elevation of lower limits of pinyon-juniper type.

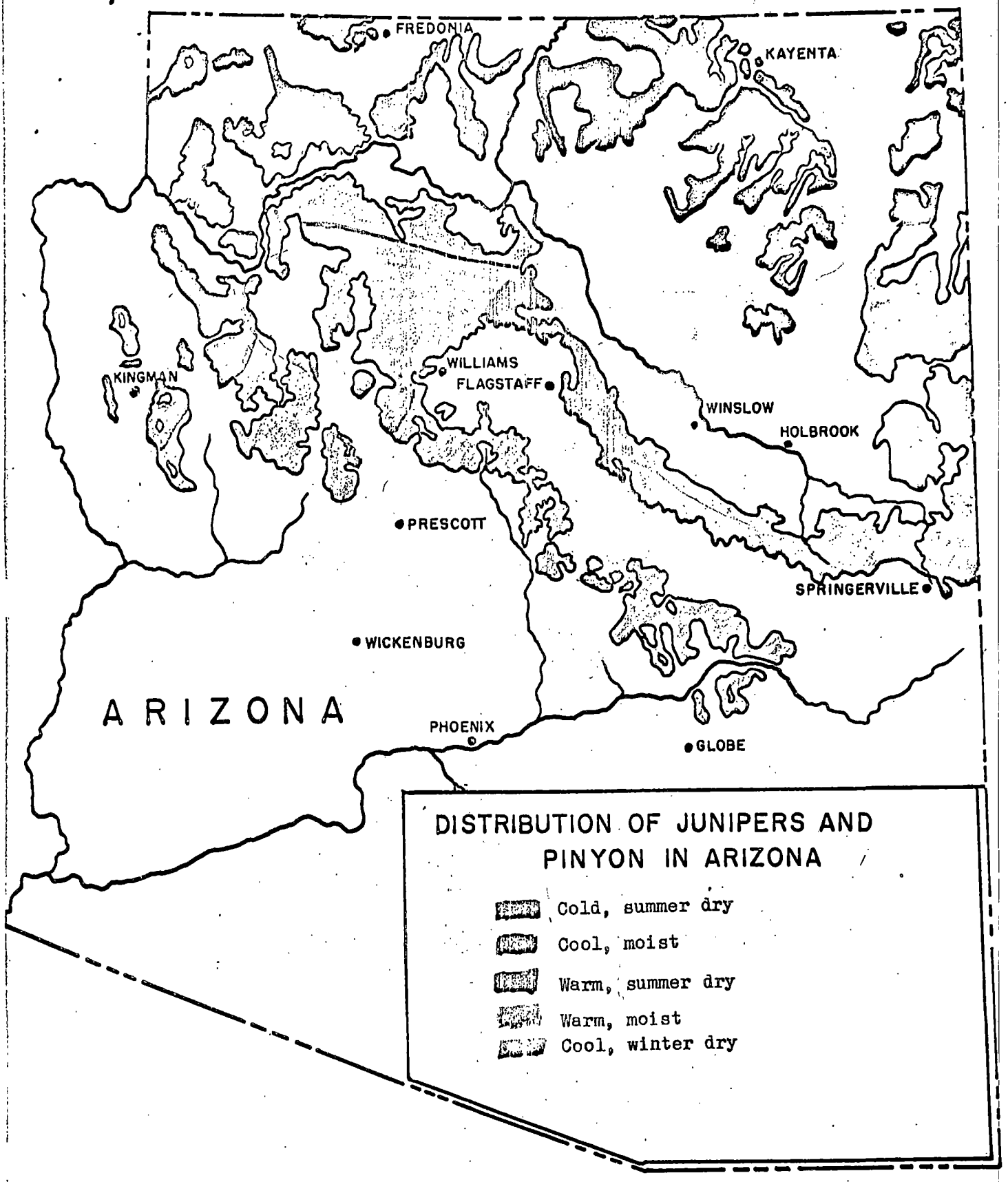


Figure 3.--Climatic zones of the pinyon-juniper type.

Zone	Precipitation		Elevation (Feet)
	Winter (Inches)	Summer (Inches)	
Cold--summer dry	7- 8	4-5	6,500-7,500
Cool--moist	8-10	6-9	6,000-7,000
Warm--summer dry	7- 9	4-6	5,000-6,800
Warm--moist	8-11	7-8	5,000-6,800
Cool--winter dry	5- 9	7-9	6,000-7,000

Geology and Soils

Geologic maps of both Arizona and New Mexico are available, and a simplified map of Arizona is presented in figure 4.

The tertiary volcanics are the most widespread and have a common boundary with most other geologic formations in the pinyon-juniper type. The other formations are relatively limited. Because the climatic change over the range of most of the geologic formations is not great, the geologic map is also a fair map of the general soil characteristics. General field observations indicate that the soils developing from the various parent materials have characteristics about as follows:

Figure 4.--Simplified geologic map of the pinyon-juniper type in Arizona.

Parent material	Infiltration capacity	Moisture holding capacity	Fertility
Kaibab limestone	High	Low	Low
Tertiary volcanics (basalt)	Medium	High	High
Quaternary volcanics	Medium to high	Low to high	Low to high
Jurassic sandstones	High	Low	Low
Mesa Verde formation	Medium	Medium	Medium
Triassic shales	Low	High	Low
Granite	High	Low	Low
Sand and gravel	High	Low	Low
Redwall limestone	Medium	Medium	Medium
Supai sandstone	Medium	Medium	Low
Coconino sandstone	High	Low	Low

Rock content of the soil and slope are usually confounded: the rockier soils usually occur on the steeper slopes. In general the rocky slopes support a more mesic, but slightly less dense, vegetation than the less rocky mesa tops. Unless they receive considerable surface flow of water, bottom land and bench sites produce about the same vegetation as the mesa tops. With additional water, of course, these sites are more productive.

The Soil Conservation Service information indicates that productivity is closely associated with degree of soil development. Some of the better developed soil sites are in swales and receive additional moisture as runoff from adjacent undeveloped soils. The

better developed soils may also have higher moisture-holding capacity and infiltration rates. Highly saline areas produce less than saline areas. The following table summarizes the S.C.S. information for Navajo, Apache, and most of Coconino County:

Soil parent material	Shallow to deep soils, well developed profile		Very shallow soils, poor profile development	
	Soil series	Forage production	Soil series	Forage production
		Lbs./acre		Lbs./acre
Basalt	Thunderbird[1/] Springerville	1,200-1,400	Thunderbird	1,200-1,400
Kaibab limestone	Crater (shallow)	1,000-1,200	Crater (very shallow)	600- 800
Moenkopi shale	Toursa	1,200-1,500	Moenkopi	500- 800
Gypsiferous Moenkopi shale	Jocity	1,200-1,500	Moenkopi (gypsum phase)	300- 500
Chinle shale			Chinle	500- 800
Bitochochee	Marcou Shephard	900-1,200	Marcou soil material	None
Sands	--	900-1,200	--	500- 800

1/ The name "Thunderbird" in this report refers to the soil series which is now called "Gem," "Tortugas" synonymous with "Winona" and "Babble."

Vegetation Subtypes

The various combinations of soils and climate have resulted in broad vegetation subtypes within the pinyon-juniper type:

1. Utah juniper-pinyon-sagebrush.--This subtype corresponds to the cold-summer dry and the warm-summer dry climatic zones (fig. 3). Major geologic formations present in the cooler areas are the Mesa Verde formation and Navajo and Wingate (Jurassic) sandstones. In the warmer areas basalt, granite, and redwall limestone are the major formations. Common understory species are Indian ricegrass (Oryzopsis hymenoides) and Spanish bayonet (Yucca baccata). Productive potential is unknown because shrub growth is generally present under natural conditions.

2. Utah juniper-pinyon-sagebrush-muttongrass.--This subtype is a more moist division of the first, and is moist enough that muttongrass (Poa fendleriana and P. longiligula) and cliffrose (Cowania mexicana) occur regularly. The subtype corresponds to the cool-moist climatic zone. Major geologic formations present are basalt and Kaibab limestone. Productive potential is probably high for the type.

3. Utah juniper-pinyon-alligator juniper-chaparral.--This subtype grades from Utah juniper-desert grasslands at its lower levels, through Utah juniper-pinyon-chaparral at the middle elevation to Utah juniper-alligator juniper at higher elevations. A number of grasses, including side-oats grama (Bouteloua curtipendula), squirreltail (Sitanion hystrix), western wheatgrass (Agropyron smithii), muttongrass, spike muhly (Muhlenbergia weightii), black dropseed (Sporobolus interruptus), and Junegrass (Koeleria cristata) are found at the higher elevations, while black grama (Bouteloua eriopoda)

and tobosa (Hilaria mutica), or galleta (H. jamesii) are found at the lower elevations. The subtype corresponds to the warm-moist climatic zone and the cinder hills of the cool-winter dry zone. Important geologic formations include granite, basalt, redwall limestone, Supai sandstone, and Coconino sandstone. Productive potential is probably high for the type.

4. One-seed juniper-pinyon-blue grama.--This subtype is rather uniform throughout its altitudinal range except that galleta is found at the extreme lower elevations. Western wheatgrass is found at the upper elevations where the parent material is basalt. Other important geologic formations are Kaibab limestone and tertiary sands and gravels. The subtype corresponds to the cool-winter dry climatic zone except for cinder areas. Productive potential is probably low for the type.

Approximate acreage of the subtypes in Arizona, New Mexico west of the Continental Divide, and the San Juan River basin in Utah and Colorado are as follows:

Subtype	Area				
	Ariz.	N.Mex.	Colo.	Utah	Total
	- - - - - Thousand acres - - - - -				
Utah juniper-pinyon-sagebrush (includes moist muttongrass subtype)	6,636	3,082	1,327	777	11,822
Utah juniper-pinyon-alligator juniper-chaparral	5,006	0	0	0	5,006
One-seed juniper-pinyon-blue grama	2,258	1,465	0	0	3,723
Total	13,900	4,547	1,327	777	20,551

Productivity of Various Sites

Available information on productivity of areas following juniper control consists of clippings made by Arnold (fig. 5), general observations, the National Forest Administration range exclosures, and data of the Soil Conservation Service.

Arnold's plots were located on areas where the juniper had been controlled 2 to 5 years previously. The following conditions at the plot locations were:

Situation A

Average annual rainfall: 17 inches--about 55 percent falls in winter.

Soil parent material: Basalt, except the point at 2 years after control, which is limestone.

Soil texture: Clay to clay-loam except the point of 2 years after control, which is sandy loam.

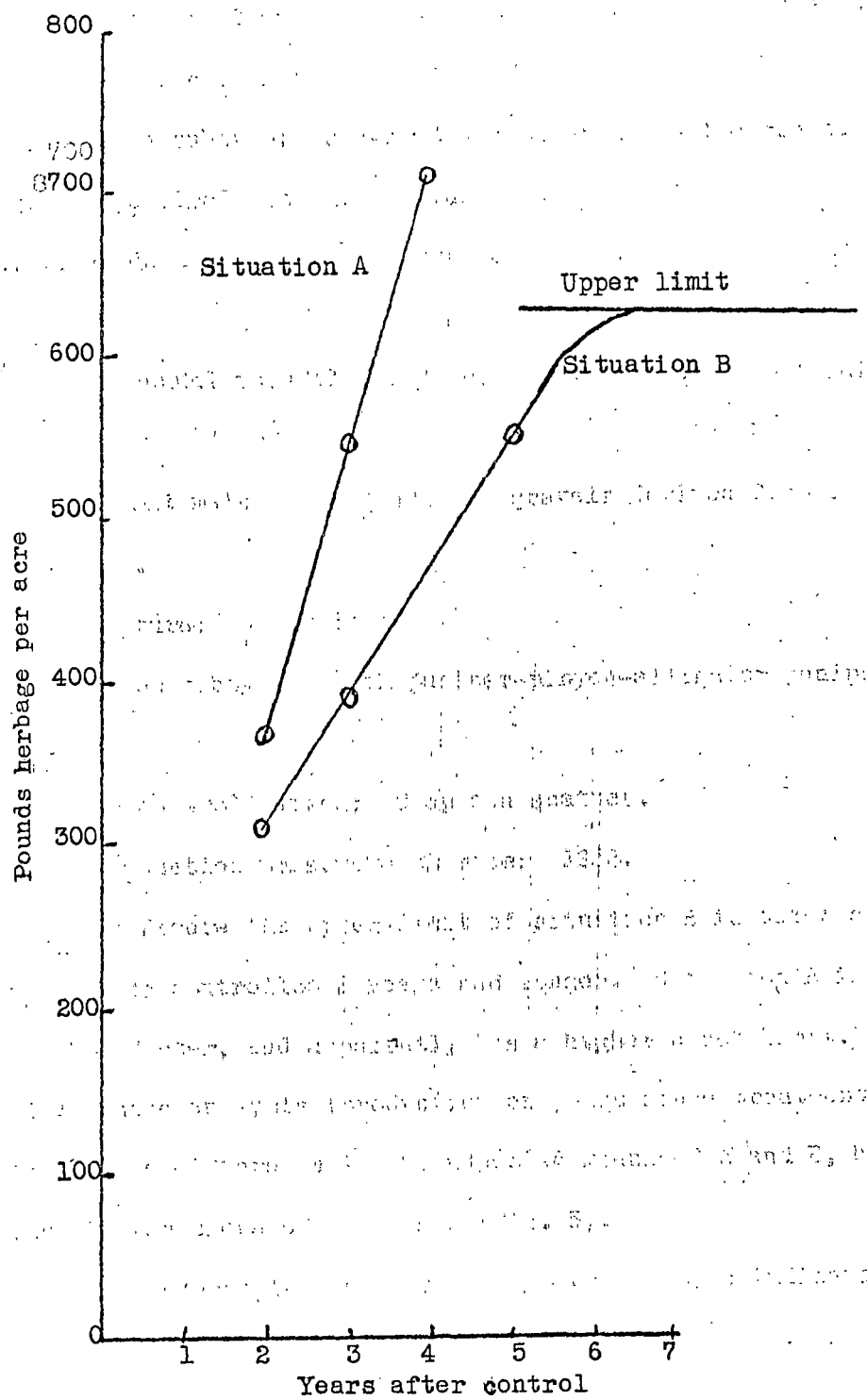


Figure 5.--Herbage production following juniper control.

Vegetation subtype: One-seed juniper-pinyon-blue grama.

Juniper control method: Bulldozing.

Year production measurements made: 1954.

Situation B

Average annual rainfall: 17 inches--about 55 percent falls in winter.

Soil parent material: Sands and gravels derived from sedimentary formations.

Soil texture: Sandy loam.

Vegetation subtype: Utah juniper-pinyon-alligator juniper-chaparral.

Juniper control method: Chop and scatter.

Year production measurements made: 1953.

In this figure the upper limit of situation B is taken as production of plots controlled 8 years and longer. Situation A increased in production faster, and apparently has a higher upper limit.

Covariance analysis (production on years since treatment) of the data shows a difference in the adjusted means of A and B, but no difference in the slope of the lines (fig. 5).

General observations of the pinyon-juniper type indicate a difference in production related to grass species present. For example, the major grass in many areas is blue grama (Bouteloua gracilis), which produces relatively little forage, and other areas support side-oats grama, muttongrass, and other high-producing species.

The National Forest Administration range exclosures are difficult to interpret because of partial tree cover and the confounding effects of both climate and soils varying together. However, the following generalization can be drawn from these data:

High-producing areas are found in the warm, moist climatic zone or in the higher parts of the cool, winter dry zone (none of the plots are located in the summer dry zones). The high-producing plots contain side-oats grama, squirreltail, black grama, galleta, or tobosa, in addition to blue grama, or receive extra surface waterflow from adjacent areas, or have a high moisture-holding capacity. Low-producing areas are found in the cool, winter dry zone, and contain mostly blue grama or blue grama and western wheatgrass.

In addition to the more widespread effects of climate and soils, there are apparent local variations in productivity associated with rock content of the soil. Rocky hillsides appear to produce more forage than rock-free areas. Usually the rock effect is confounded with slope.

OBJECTIVES AND SCOPE

The overall objective of the study is to determine productivity of various sites of the pinyon-juniper type expressed in grass production. This has been accomplished in three parts:

1. A survey of the common boundaries of the tertiary volcanics and other geologic formations within the pinyon-juniper type to determine the feasibility of establishing paired study plots at these boundary areas.

2. Comparison of the fertility and physical properties of soils developed from tertiary volcanics to determine the comparability of the volcanic soils at different locations.

3. Comparison of the productivity of selected pairs of plots selected on the basis of knowledge gained under objectives 1 and 2.

PLOT LOCATIONS

Common boundaries of tertiary and quaternary basalt flows with other geologic formations were surveyed in 1960-61 to locate pairs of study plots. Plots with basaltic clay soils of the Thunderbird and Springerville series were selected at each location. The other soil in the plot pair was a typical soil developed from one of the other geologic formations included.

The plots selected range from Peach Springs in western Arizona to Carrizo in the east-central part of the State (fig. 6).

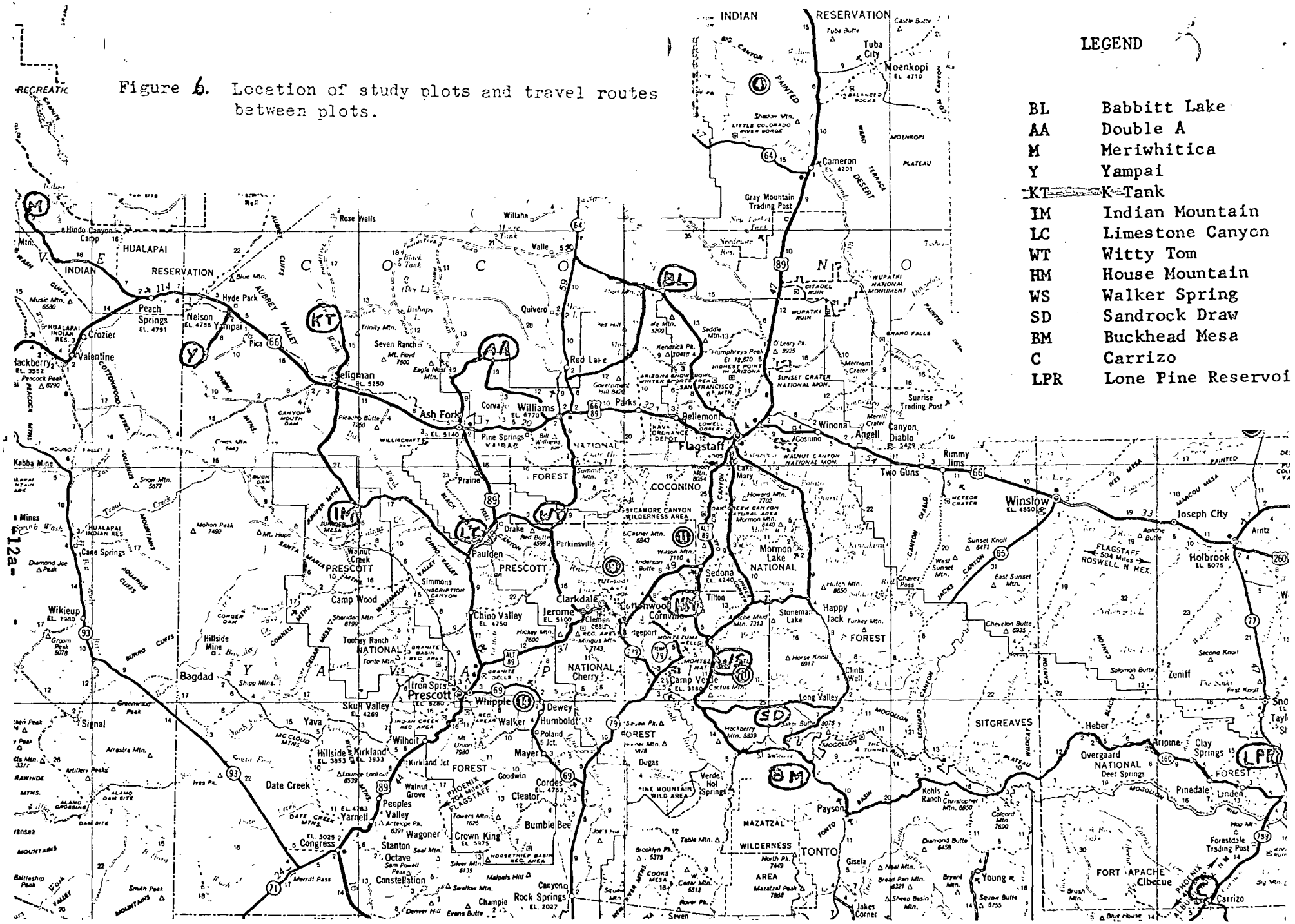
All plots meet the following criteria:

1. They are within the pinyon-juniper type.
2. The soils are of general importance.
3. Slopes are less than 10 percent.
4. The plots are within a single pasture.
5. The two members of the pair are within one-half mile of each other.
6. The plots are accessible by easily travelled roads. In most cases these are all-weather roads.

The plots selected are located as follows:

1. Babbitt Lake, Coconino National Forest, Flagstaff District,
2. Double A, Kaibab National Forest, Williams District.
3. Meriwhitica (Black Canyon Tank), Hualapai Indian Reservation.
4. Yampai, Rubel Ranch, Seligman, Arizona.
5. Indian Mountain, Prescott National Forest, Walnut Creek District.

Figure 6. Location of study plots and travel routes between plots.



6. Hell Canyon, Prescott National Forest, Drake District.

7. Witty Tom, Prescott National Forest, Drake District.

8. Walker Spring (also referred to as Rimrock), Coconino National Forest, Beaver Creek District.

9. Sandrock Draw, Coconino National Forest, Beaver Creek District.

10. Buckhead Mesa, Tonto National Forest, Payson District.

11. Carrizo, Fort Apache Indian Reservation.

12. Lone Pine Dam, Sitgreaves National Forest, Lakeside District.

Directions for locating each plot are included in the following pages. Aerial photos used are indicated, and the plot locations are marked on the aerial photos. Since relocating such study plots is often difficult, all project personnel have visited all of the plots.

1. Plot name: Babbitt Lake
2. Nearest town: Flagstaff, Arizona
3. Location: Sec. 3, T25N, R5E
4. Travel directions: 1 mile northwest of Babbitt Lake, Cedar Ranch
5. Geologic formation compared with basalt: Kaibab - sandy limestone
6. Ownership: Coconino National Forest, Flagstaff District
7. Aerial photo numbers: GS-VVP 5-21, 5-22, 5-23
8. 4 x 5 close-up photos DJ 398, 399, 400, 401

Page 14a follows

Figure 7.--Photos from Babbitt Lake plot.

Page 14b follows

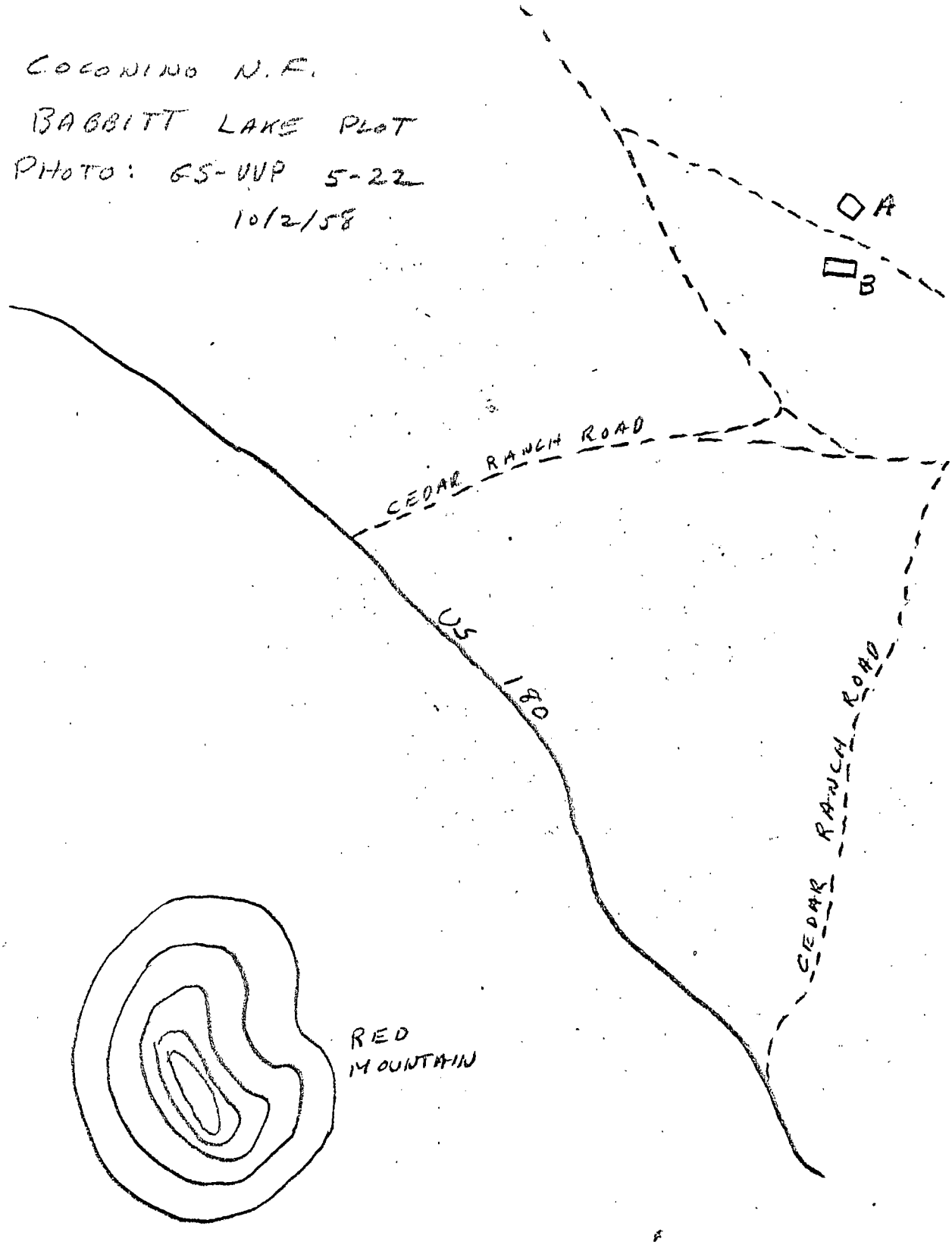

COCONINO N.E.
BABBITT LAKE PLOT
PHOTO: GS-UVP 5-22
10/2/58
A
B
CEDAR RANCH ROAD
US 180
CEDAR RANCH ROAD
RED MOUNTAIN

Figure 8.

1. Plot name: Double A
2. Nearest town: Williams, Arizona
3. Location: Sec. 29, T23N, R1W
4. Travel directions: 1.5 miles north of Double A Ranch
5. Geologic formation compared with basalt: Kaibab chert
6. Ownership: Kaibab National Forest, Williams District
7. Aerial photo numbers: GS-VVP 4-40, 4-39, 4-38
8. 4 x 5 close-up photos DJ 406, 407, 408, 409

Page 15a follows

Figure 9.--Photos from Double A plot.

Page 15b follows

KAIBAB N.F.
DOUBLE A PLOT
PHOTO: GS-VVP 4-38 9/22/58

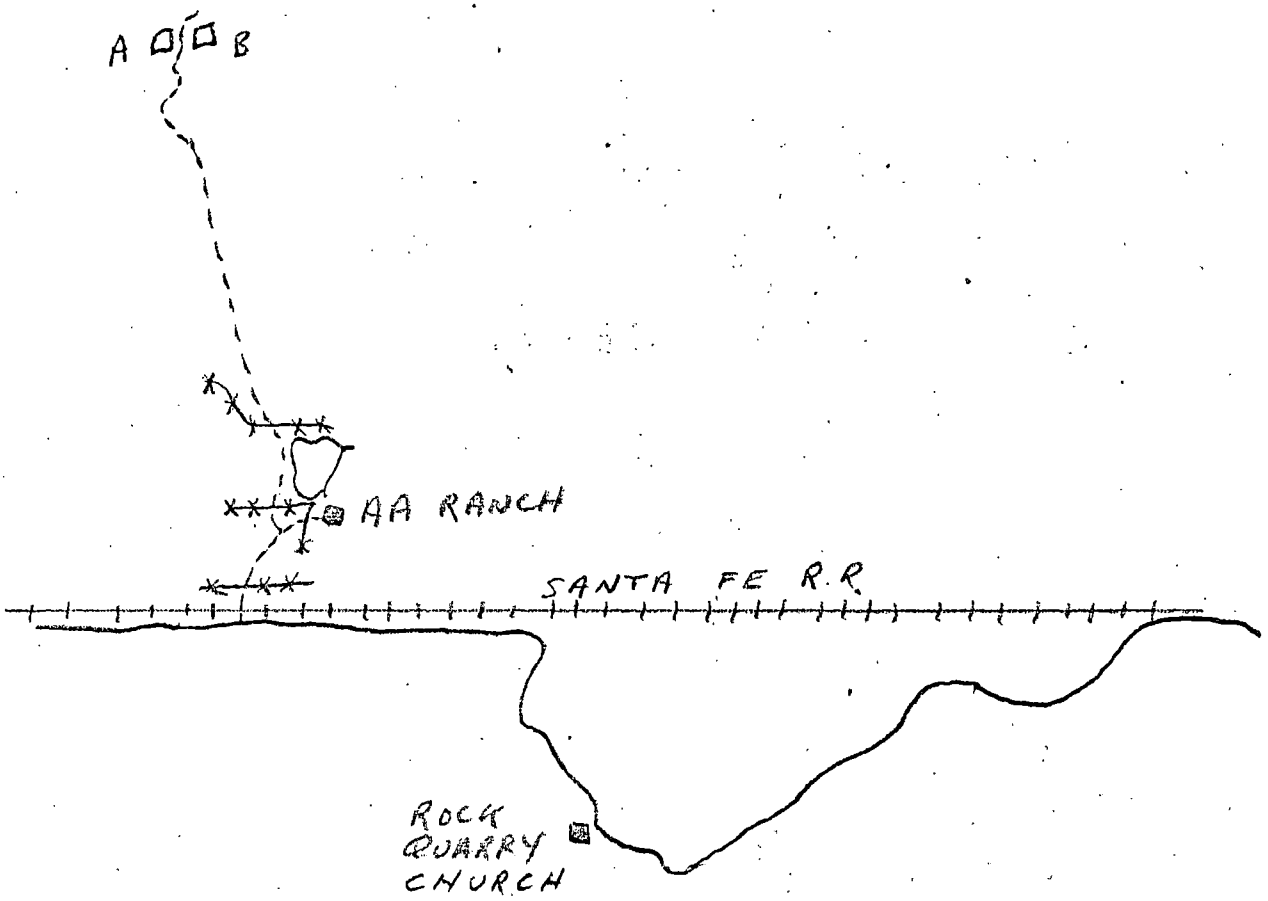


Figure 10.

1. Plot name: Black Canyon
2. Nearest town: Peach Springs, Arizona
3. Location: SW¼ Sec. 17, NW¼ Sec. 19, T27N, R14W
4. Travel directions: 57 miles northwest of Peach Springs near Black Canyon Tank
5. Geologic formation compared with basalt: Redwall limestone
6. Ownership: Bureau of Indian Affairs, Truxton Canyon Subagency, Valentine, Arizona
7. Aerial photo numbers: VVHU 1435, 1434 (not in study file)
8. 4 x 5 close-up photos DJ 394, 395, 396, 397

Page 16a follows

Figure 11.--Photos from Meriwhitica (Black Canyon Tank).

Page 16b follows

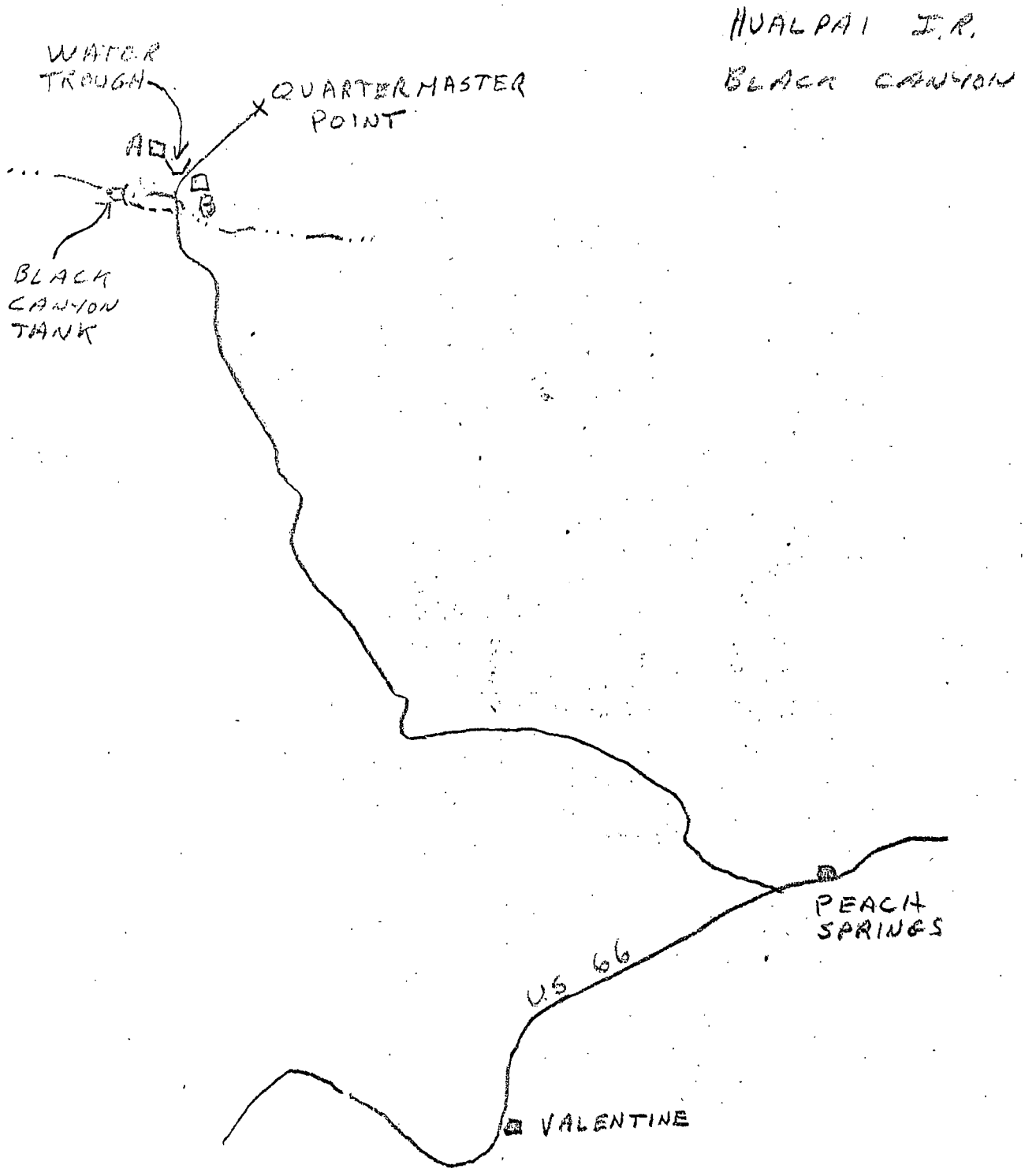

HUALPAI I.R.
BLACK CANYON
WATER TROUGH
QUARTERMASTER POINT
A
B
BLACK CANYON TANK
PEACH SPRINGS
U.S. 66
VALENTINE

Figure 12.

1. Plot name: Yampai
2. Nearest town: Hyde Park, Arizona
3. Location:
4. Travel directions: 9 miles south of Hyde Park, then west 1 mile to tank
5. Geologic formation compared with basalt: Supai
6. Ownership: N.S. Ranches, Phoenix, Arizona
7. Aerial photo numbers: VVHU 2315, 2316, 2317, 2414, 2415, 2416 (not in study file)
8 4 x 5 close-up photos DJ 382, 383, 384, 385

Page 17a follows

Figure 13.--Photos showing roads to Yampai plot.

Page 17b follows

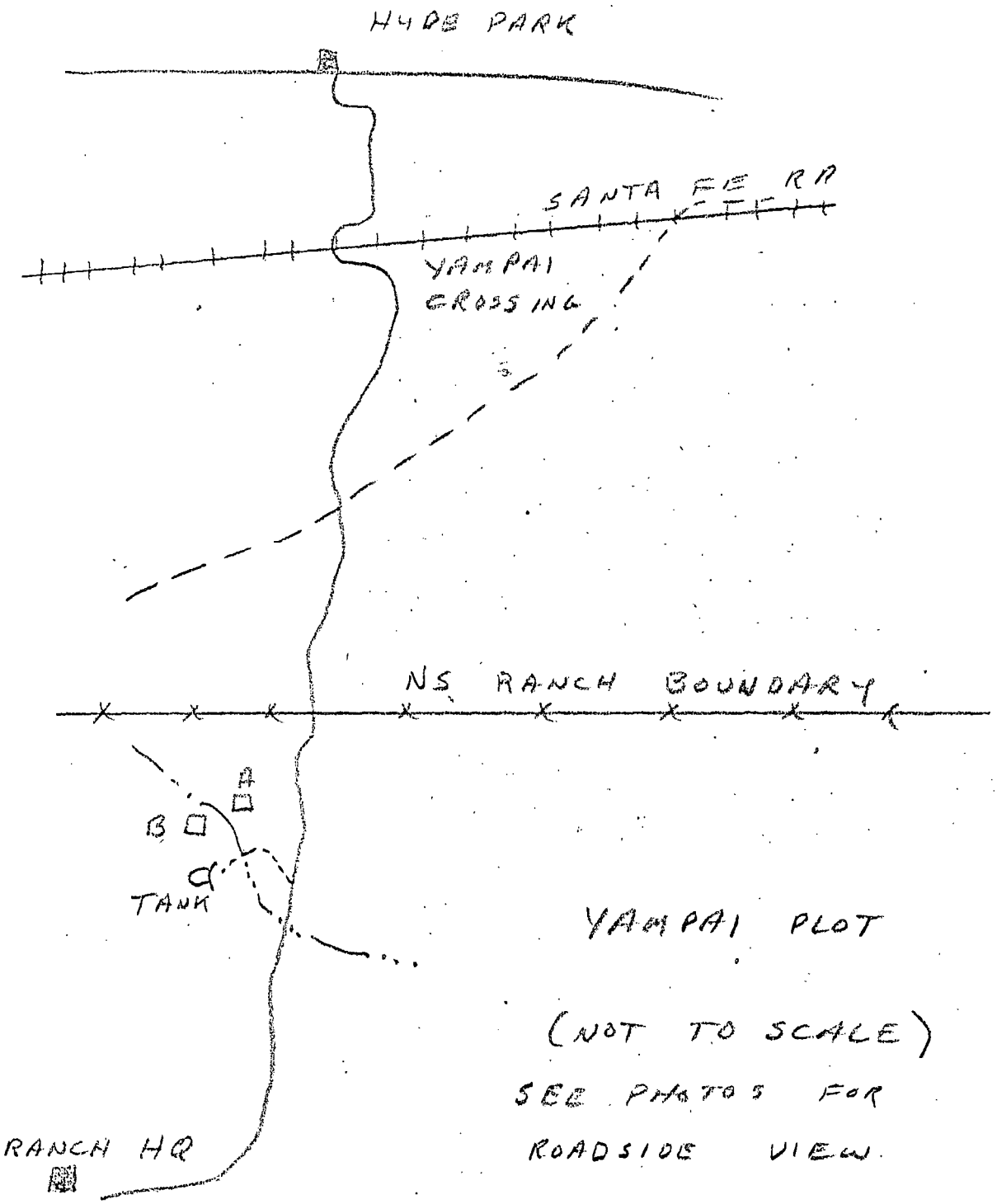

HYDE PARK
SANTA FE RR
YAMPAI
CROSSING
NS RANCH BOUNDARY
A
B
TANK
YAMPAI PLOT
(NOT TO SCALE)
SEE PHOTOS FOR
ROADSIDE VIEW
RANCH HQ

Figure 14.

1. Plot name: Indian Mountain
2. Nearest town: Seligman, Arizona
3. Location: Sec. 4, T18N, R5W
4. Travel directions: 3 miles north of junction of Walnut Creek road and Seligman-Prescott road
5. Geologic formation compared with basalt: Granite
6. Ownership: Prescott National Forest, Walnut Creek District
7. Aerial photo numbers: COU 5-134, 5-135, 5-136, 5-137, COU 1-90, 1-91, 1-92 (not in study file)
8. 4 x 5 close-up photos DJ 386, 387, 388, 389

Page 18a follows

Figure 15.--Photos from Indian Mountain plot.

Page 18b follows

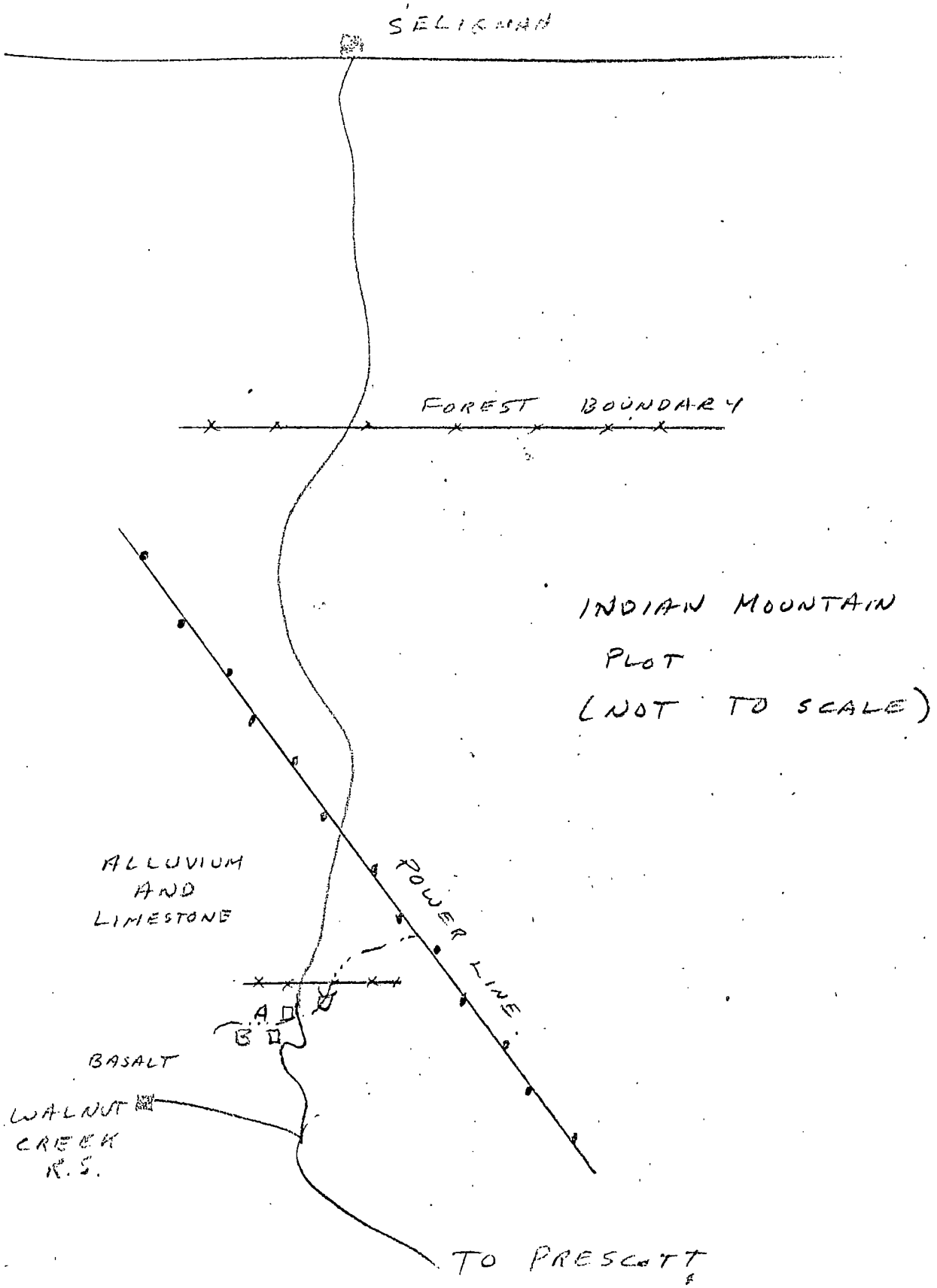

SELIGMAN
FOREST BOUNDARY
INDIAN MOUNTAIN
PLOT
(NOT TO SCALE)
ALLUVIUM
AND
LIMESTONE
POWER LINE
A
B
BASALT
WALNUT
CREEK
R.S.
TO PRESCOTT

Figure 16.

1. Plot name: Limestone Canyon
2. Nearest town: Paulden, Arizona
3. Location: Sec. 14, T18N, R2W
4. Travel directions: Between Wishing Well and Drake on old Highway 89.
5. Geologic formation compared with basalt: Redwall limestone
6. Ownership: Prescott National Forest, Drake District
7. Aerial photo numbers: COU 10-152, 10-153 (not in study file)
8. 4 x 5 close-up photos DJ 362, 353, 364, 365 (no roadside scenes)

1. Plot name: Witty Tom
2. Nearest town: Drake, Arizona
3. Location: Sec. 1, T18N, R1E
4. Travel directions: 1 mile north of Drake-Williams-Perkinsville junction
5. Geologic formation compared with basalt: Tapeats sandstone
6. Ownership: Prescott National Forest, Drake District
7. Aerial photo numbers: COU 5-50, 5-49, 5-48
8. 4 x 5 close-up photos DJ 366, 367, 368, 369

Page 20a follows

Figure 17.--Photos from Witty Tom plots.

Page 20b follows

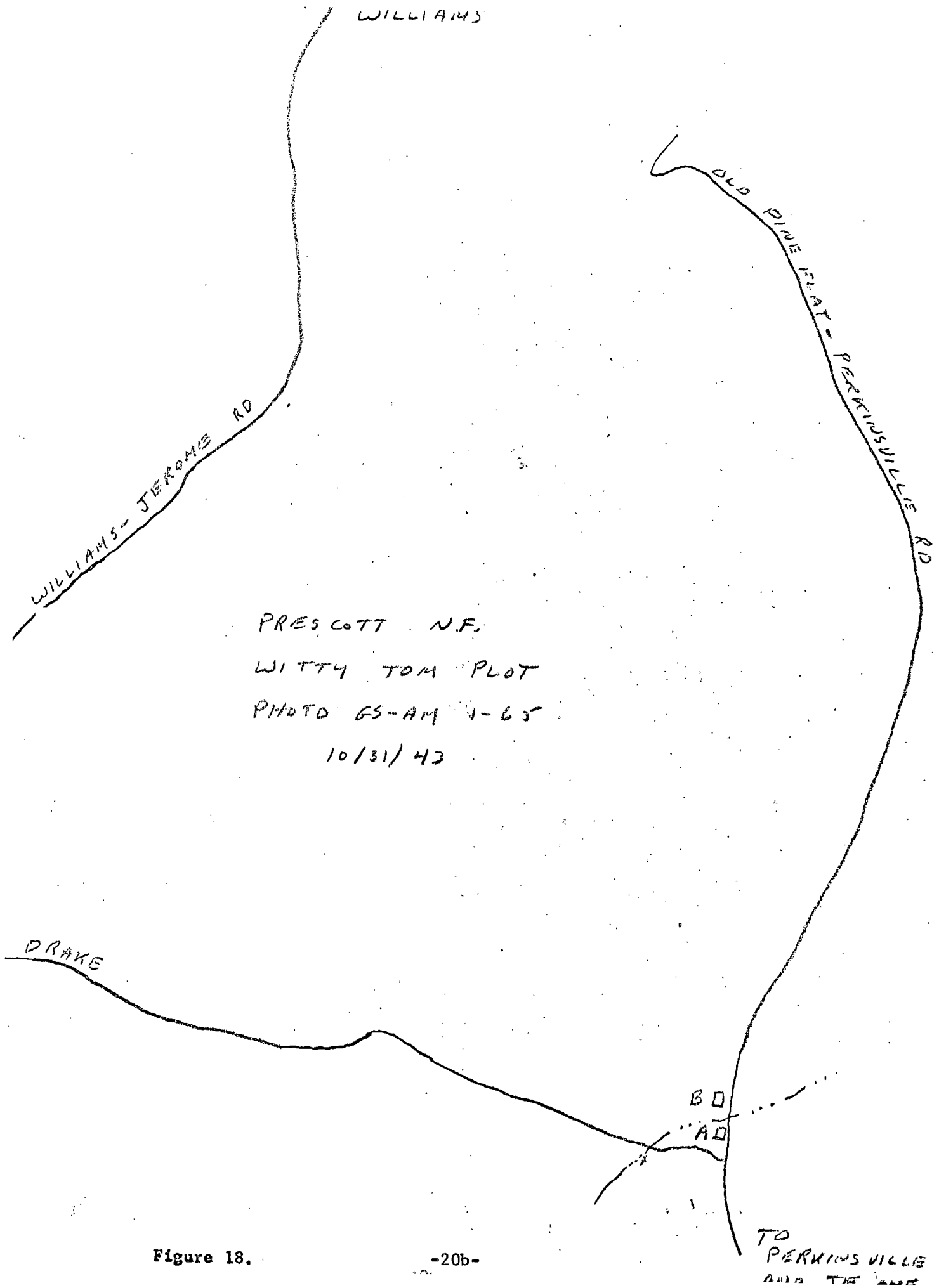

WILLIAMS
OLD PINE CREAT - PERKINSVILLE RD
WILLIAMS - JEROME RD
PRESCOTT N.F.
WITTY TOM PLOT
PHOTO GS-AM 1-65
10/31/43
DRAKE
BO
AD
TO PERKINSVILLE

Figure 18.

1. Plot name: Walker Spring
2. Nearest town: Rimrock, Arizona
3. Location: Sec. 8, T14N, R6E
4. Travel directions: 3 miles south of Beaver Creek Ranger Station on Fossil Creek road
5. Geologic formation compared with basalt: Verde Lake limestone
6. Ownership: Coconino National Forest, Beaver Creek District
7. Aerial photo numbers: EGE 11-183, 11-182, 11-181
8. 4 x 5 close-up photos DJ 390, 391, 392, 393

Page 21a follows

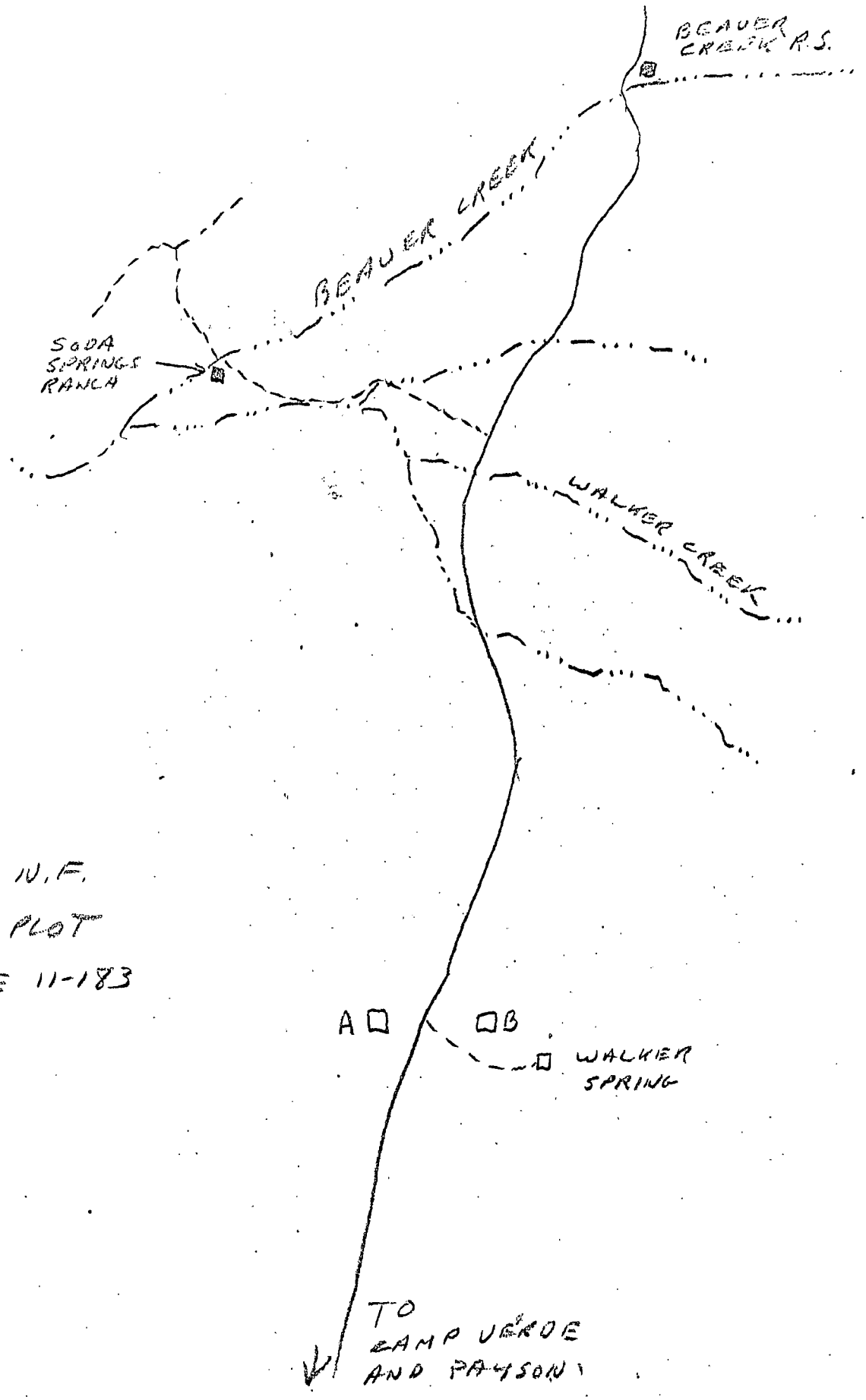

BEAVER CREEK R.S.
BEAVER CREEK
SODA SPRINGS RANCH
WALKER CREEK
COCONINO N.F.
WALKER PLOT
PHOTO EGE 11-183
9/8/59
A
B
WALKER SPRING
TO CAMP VERDE AND PAYSON

Figure 19.

Figure 19a.--Photos from Walker Spring plots.

1. Plot name: Sandrock Draw
2. Nearest town: Camp Verde, Arizona
3. Location: Sec. 8, T13N, R8E
4. Travel directions: 17 miles east of Camp Verde-Payson road on Tom's Creek road
5. Geologic formation compared with basalt: Kaibab limestone
6. Ownership: Coconino National Forest, Beaver Creek District
7. Aerial photo numbers: DGJ 9-146, 9-145
8. 4 x 5 close-up photos DJ 378, 379, 380, 381

Page 22a follows

Figure 20.--Photos on road near Sandrock Draw plots.

Page 22b follows

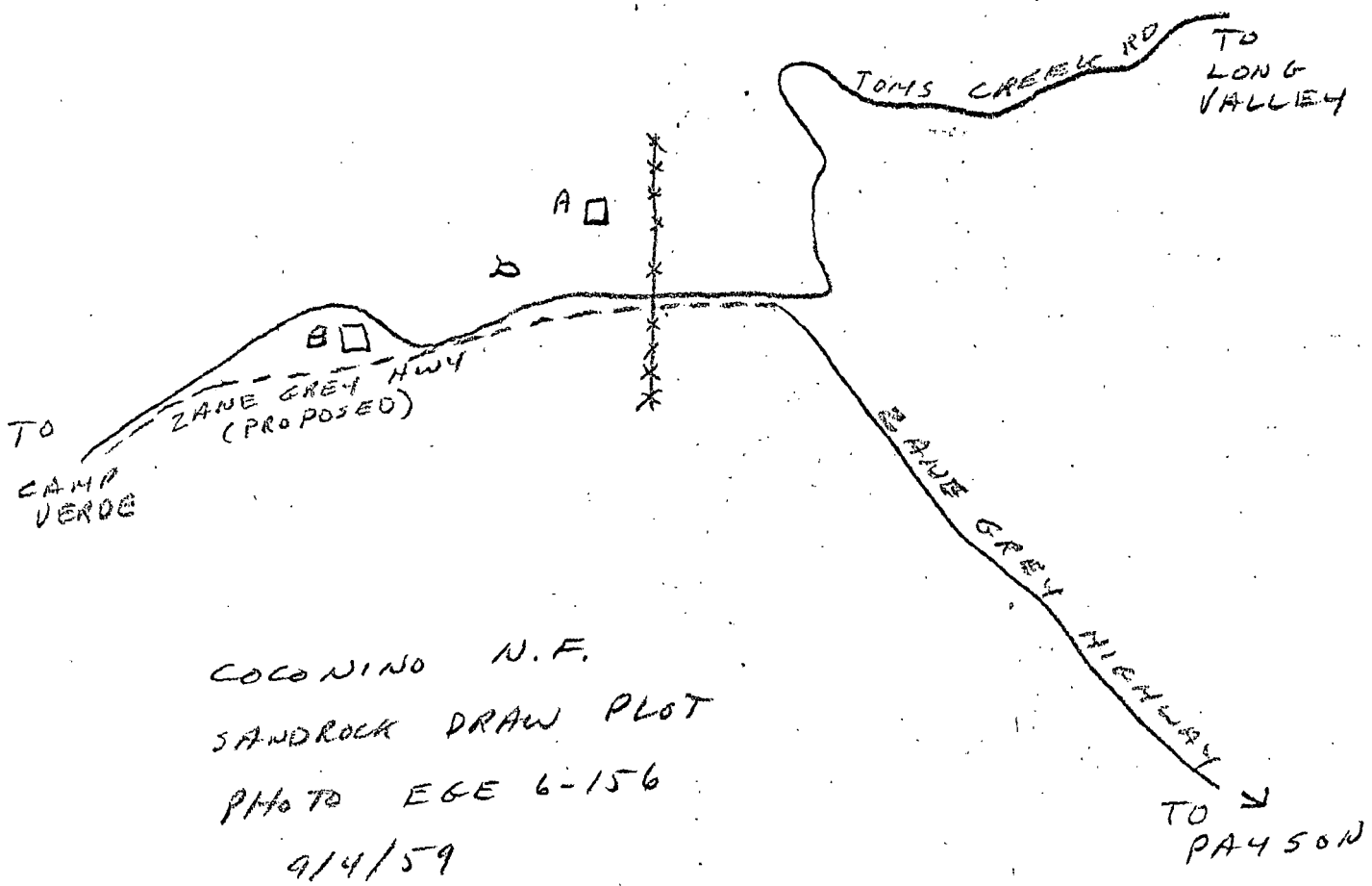

TOMS CREEK RD
TO LONG VALLEY
A
B
ZANE GREY HWY (PROPOSED)
TO CAMP VERDE
ZANE GREY HIGHWAY
TO PAYSON
COCONINO N.F.
SANDROCK DRAW PLOT
PHOTO EGE 6-156
9/4/59

Figure 21.

1. Plot name: Buckhead Mesa
2. Nearest town: Pine, Arizona
3. Location: Sec. 34, T11½N, R7E
4. Travel directions: 0.7 mile north of junction of Natural Bridge road and Pine-Payson road. Turn left 0.2 mile
5. Geologic formation compared with basalt: Tapeats sandstone
6. Ownership: Tonto National Forest, Payson District
7. Aerial photo numbers: EEA 9-89, 9-90, 9-91
8. 4 x 5 close-up photos DJ 402, 403, 404, 405

Page 23a follows

Figure 22.--Photos from Buckhead Mesa plots.

Page 23b follows

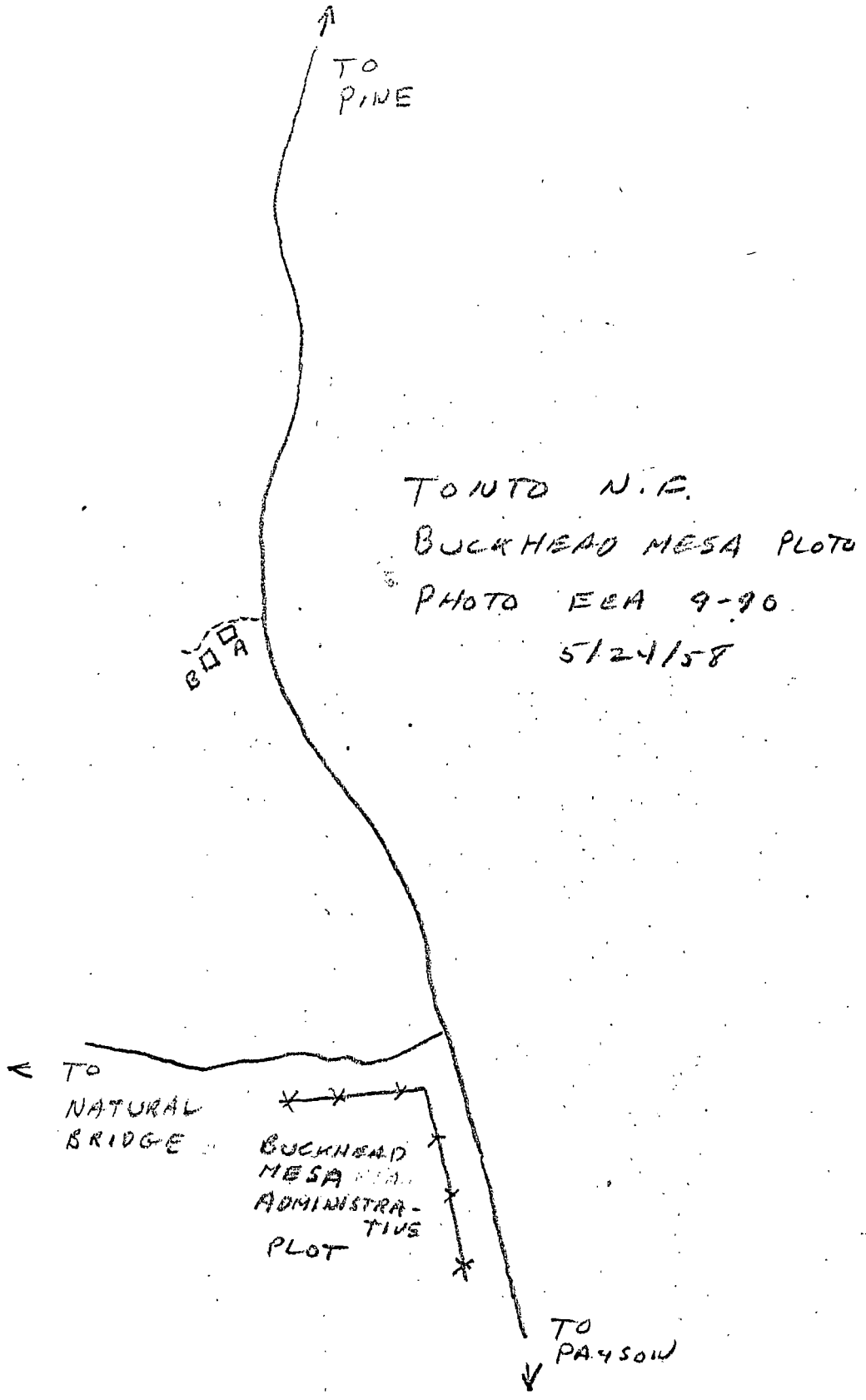

TO
PINE
TONTO N.F.
BUCKHEAD MESA PLOTS
PHOTO EEA 9-90
5/24/58
B
A
TO
NATURAL
BRIDGE
BUCKHEAD
MESA
ADMINISTRA-
TIVE
PLOT
TO
PAYSON

Figure 23.

1. Plot name: Carrizo
2. Nearest town: Carrizo Store, Arizona
3. Location:
4. Travel directions: 1 mile north of Carrizo Store
5. Geologic formation compared to basalt: Supai formation
6. Ownership: Bureau of Indian Affairs, Whiteriver, Arizona
7. Aerial photo numbers: Flt. 19 Nos. 4-139, 4-140, 4-141; Flt. 20 Nos. 14-143, 14-144, 14-145
8. 4 x 5 close-up photos DJ 374, 375, 376, 377

Page 24a follows

Figure 24.--Photos from Carrizo plots.

Page 24b follows

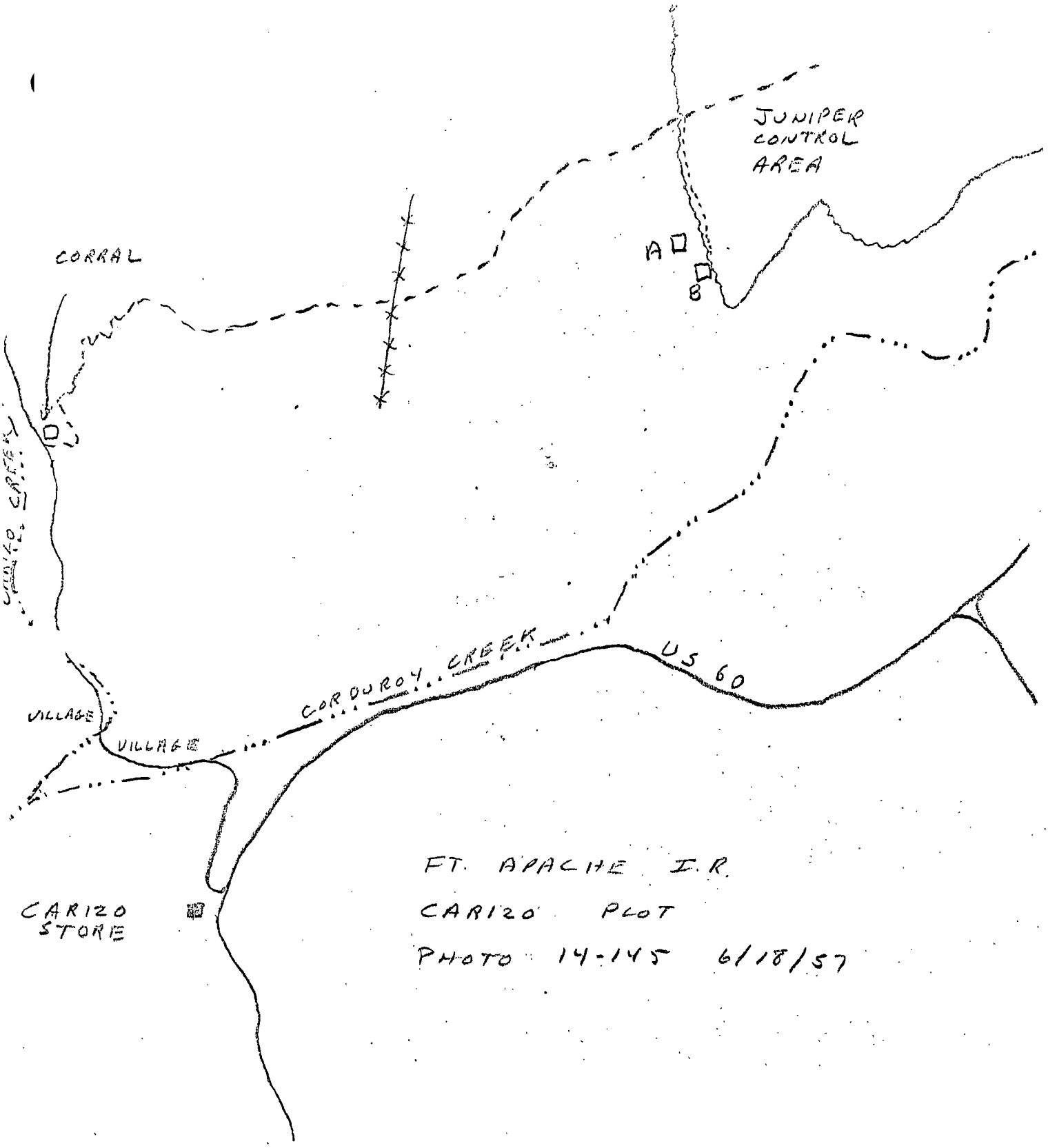

JUNIPER
CONTROL
AREA
CORRAL
A
B
D
CORDUROY CREEK
US 60
VILLAGE
VILLAGE
CARIZO
STORE
FT. APACHE I.R.
CARIZO PLOT
PHOTO 14-145 6/18/57

Figure 25.

1. Plot name: Lone Pine Dam
2. Nearest town: Show Low, Arizona
3. Location: Sec. 13, T11N, R21E
4. Travel directions: ½ mile east of Lone Pine Dam
5. Geologic formation compared to basalt: Quaternary gravel
6. Ownership: Sitgreaves National Forest, Lakeside District
7. Aerial photo numbers: DTO 3-118, 3-119, 3-120
8. 4 x 5 close-up photos DJ 370, 371, 372, 373

Page 25a follows

Figure 26.--Photos from Lone Pine Dam plots.

Page 25b follows

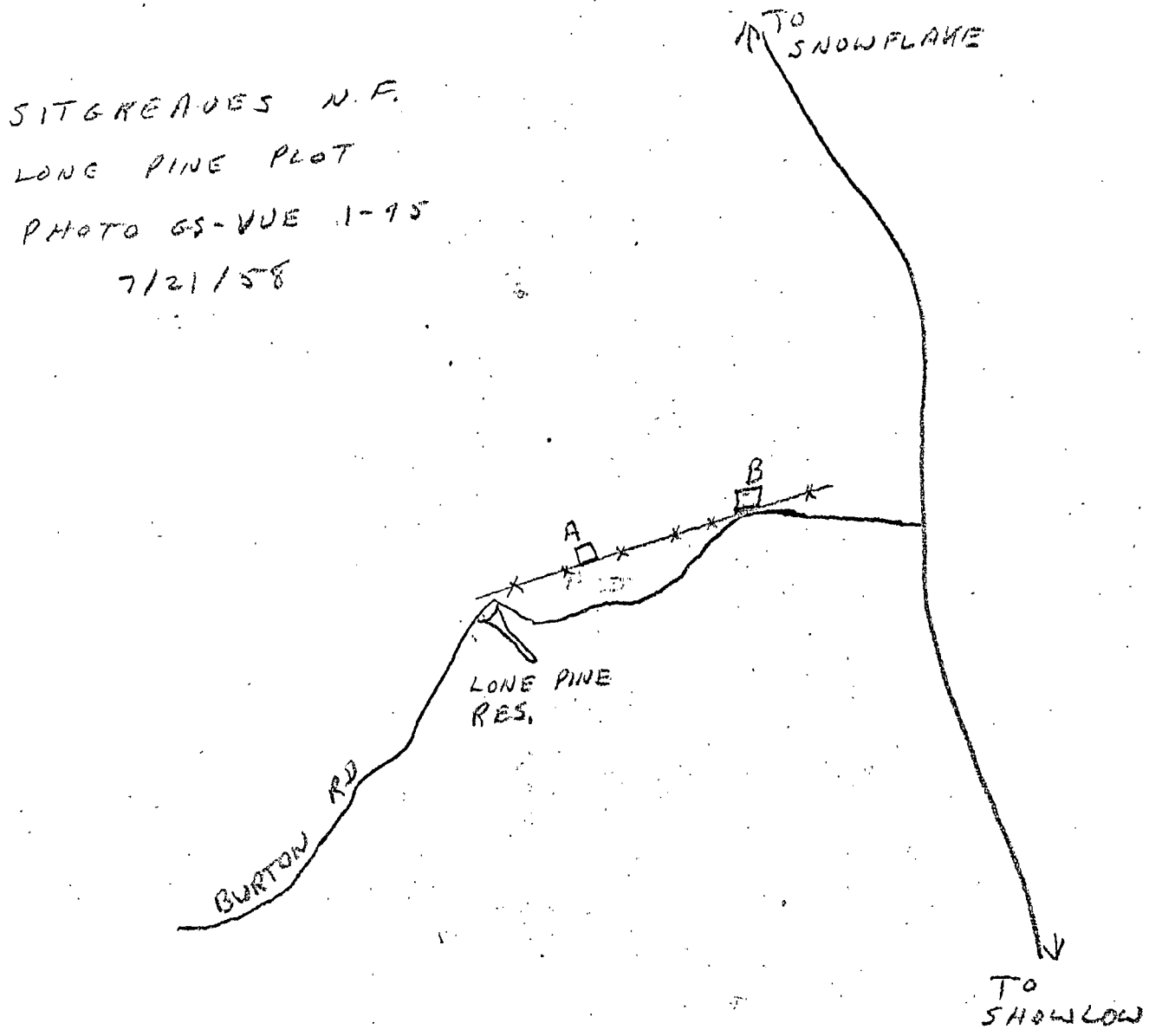

SITGREAVES N.F.
LONE PINE PLOT
PHOTO GS-VUE 1-95
7/21/58
TO SNOWFLAKE
B
A
LONE PINE RES.
BURTON RD
TO SHOWLOW

Figure 27.

PLOT LAYOUT

Subplot markers were located in each plot as shown in figure 28. Each stake was marked to show the coordinates in tens of feet. Thus the plots in the upper left corner of figure 21 were marked 1-0 and the plot in the upper right was 19-0. The same subplot layout was applied to all plots. Generally the origin was in the northwest corner.

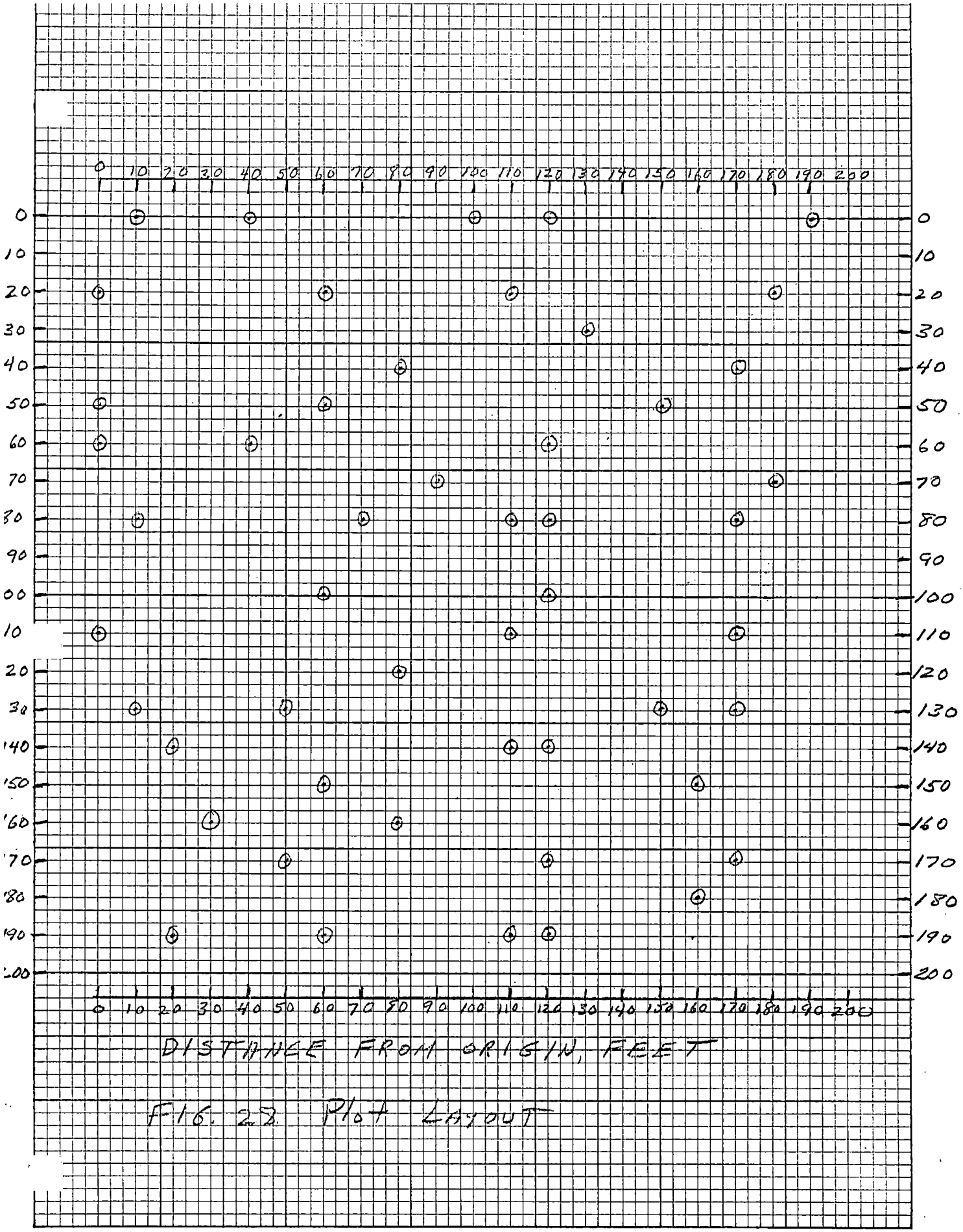


FIG. 22. PLOT LAYOUT

MEASUREMENTS

PRETREATMENT VEGETATION MEASUREMENTS

Before treatment tree and shrub canopy was determined with a spherical densiometer. Rock, litter, and herbaceous species were measured with a 1 meter x 1 meter 50-point frame with points spaced 1 x 2 dm. Results of these pretreatment measurements are in the study file and are summarized in table 1.

SOIL MEASUREMENTS

Profile Description

At each study plot complete soil profile descriptions were made according to standard soil survey techniques (Agricultural Handbook No. 18). Results are given in tables 2-25.

Mechanical Analysis

Samples were collected in the field and mechanical analyses with the Bouyoucos hydrometer method were completed in the laboratory (table 26).

VEGETATION PRODUCTION MEASUREMENTS

Vegetation was determined with 9.6 square foot circular plots. All plots were estimated and one of each five plots was chosen at random to provide conversion terms to actual oven-dry weight. Production measurements were made before treatment in 1963, after treatment measurements began in 1965. Results are given in tables 31-55.

Table 1. TREES AND SHRUBS ON SITE POTENTIAL PLOTS

(CANOPY MIRROR, 1961, 1962)

	Rock	Litter	Total trees	Juos	Jumo	Jude	Pinus	Befr	Qutu	Come
Lone Pine-Snow Flake	0.08	15.64	13.272	4.098	9.174					
Sand Rock Draw-Hogg (Quga 7.630)	.68	38.32	28.810	.009		4.962	12.209			
Babbitt Lake-Tortugas	9.68	35.96	30.897	0	3.093		27.804			
Rim Rock-Retriever (Caho 8.679; ACAC 0.016)	8.96	15.80	13.388	3.111				0.1582		
Hell Canyon-Tortugas (MIMO 0.275; OPUN 0.718; Leg. Sh. 0.006)	22.92	7.88	5.375	1.167				.029		3.180
Yampai-Dye	.36	20.40	10.129	9.680			.449			
Carrizo-Ruin (ARCT 0.744)	.40	73.48	37.203	28.484			2.578		5.397	
Buck Head Mesa-BM (Rhtr 1.682; Quem 3.656; ARCT 4.458; Cemo 0.848)	6.56	28.20	43.209	1.671		9.920	1.538		19.436	
AA-Show Low	.12	24.04	22.365	22.337			.028			
Witty Tom-Cross	.12	11.72	9.071	9.004				.067		
Indian Mountain-Lynx (Unsh. 0.225)	0	20.44	18.458	17.726			.264	.243		
Black Canyon-Tortugas	13.64	24.16	12.288	4.146					2.032	.523

Table 1 Cont'd.

	Rock	Litter	Total trees	Juos	Jumo	Jude	Pinus	Befr	Qutu	Come
GEM:										
Lone Pine	9.60	17.84	16.180	9.570	5.937		.380	.293		
Sand Rock Draw	16.04	7.40	6.933	1.645		4.808				
Babbitt Lake	10.92	44.52	28.864		13.275		15.589			
Rim Rock	20.56	2.40	2.088	1.025						
(Caho 0.853; Prju 0.208; ACAC 0.002)										
Hell Canyon	22.56	0	0							
Yampai	17.60	17.66	9.438	9.438						
SPRINGERVILLE:										
Carrizo	15.96	38.96	29.133	28.597			.346		.190	
Buck Head Mesa	21.20	22.56	22.971	14.225		8.631				
(Rhtr 0.117)										
AA	16.00	22.76	22.972	22.972						
Witty Tom	11.80	24.24	19.134							
Indian Mountain	23.08	24.40	18.977	18.035	.942					
Black Canyon	8.60	22.28	16.827	16.734						.093

Table 2.

Soil type Thunderbird Stony Loam			File No.
Area Babbitt Lake - Central Coconino County		Date 10 July 1961	Stop No.
Classification Brown - Reddish Brown			
Location			
N. veg. (or crop) Woodland		Climate PPt 12"-14"	
Parent material Basalt - Residual			
Physiography Sloping Mesa			
Relief Slightly Convex Smooth	Drainage Well drained	Salt or alkali none	
Elevation 6,000 ?	Gr. water Very deep	Stoniness Stony	
Slope 4%	Moisture Dry		
Aspect North	Root distrib. (over)		
Erosion Slight - none			
Permeability Moderate			
Additional notes			

Many gravel sized pebbles through profile

15-20% stones in soil mass.

Form-SCS-232C-Soil Description 6-28-55

GPO 874130

U. S. GOVERNMENT PRINTING OFFICE:1955 O—35225

Page 31a follows

Table 2 cont'd

Horizon	Depth	Color		Texture	Structure	Consistence			Reaction PH	Boundary	Roots	Pores	Clay Film
		Dry	Moist			Dry	Moist	Wet					
A1	0-2	10 YR 5/3	10 YR 3/3	Stony Loam	vfgr	Soft	vfr	so-po	0 7.0	AS	Few Med.	Many very fine interstitial	0
B1	2-13	10 YR 5/2	10 YR 3/2	Stony Clay Loam+	1msbk	sh	fi	s-p	0 7.0	GS	Plentiful Fine Med.	Few Fine Tubular	Thin Patchy
B2	13-17	7.5 YR 4/2	7.5 YR 4/2	Stony Clay	2fsbk	vh	vfi	vs-vp	e 8.0	AW	plentiful Fine Med. Expoed.	Few Fine Tubular Expo d.	Thin Continus
C ca	17-24	7.5 YR 8/6	7.5 YR 6/6	Stony Loam	Massive	sh	fr	so-ps	ev 8.5	AW	Plenful Fine Med.	Few Fine Tubular	0
Dr	24+	Basalt	Bedrock										

Table 3.

Soil type Tortugas Winona Gravelly loam		File No.
Area Babbitt Lake - Central Coconino County	Date 10 July 61	Stop No.
Classification Lithosol-Calcisol Intergrade		
Location		
N. veg. (or crop) Woodland		Climate 12-14"
Parent material Kaibab limestone		
Physiography Mesa - Gently rolling		
Relief Smooth-flat	Drainage well drained	Salt or alkali none
Elevation 6,000 ?	Gr. water Very deep	Stoniness Stony
Slope 1%	Moisture Dry	
Aspect SW	Root distrib. (over)	
Erosion None		
Permeability Moderate		
Additional notes		

Jameson
Mitchell

Form-SCS-232C-Soil Description 6-28-55

GPO 874130 U. S. GOVERNMENT PRINTING OFFICE: 1955 O—35

Page 32a follows

Table 3 cont'd

Horizon	Depth	Color		Texture	Structure	Consistence			Reaction	Boundary			
		Dry	Moist			Dry	Moist	Wet	PH		Roots	Pores	Clay Film
A11	0-1	10 YR 5/4	10 YR 3/4	Gravelly Loam	Fine Granulr lfgr	s	vfr	so-po	ev	CS	Few Med.	Common Fine Intersti-tiel	0
A12	1-7	10 YR 4/3	10 YR 3/3	Gravelly Loam	lmsbk breaking to lfgr	sh	fr	so-po	ev	CW	Plen-tiful Med.	Common Fine Tubular	0
C1	7-12	10 YR 6/4	10 YR 5/4	Stony Loam	Massive	sh	fr	so-po	ev	AW	Few Med. & Fine	Few Fine Tubulr	0
Dr	12+	Kaibab Massive Limestone											
		5% of area has exposed bedrock C1 has extremely fractured industrial pan or limestone fragments with lime coatings on underneath side.											
		Few coarse juniper roots in C horizon											

Table 4.

Soil type Springerville Cobbly Clay		File No.
Area AA-Central Coconino Co.	Date 10 July 61	Stop No.
Classification Grumusol		
Location		
N. veg. (or crop) Woodland		Climate PPt 14-16
Parent material Basalt - Residual		
Physiography Gently rolling plains		
Relief Convex-smooth	Drainage Well drained	Salt or alkali none
Elevation 6350	Gr. water Very deep	Stoniness Cobbly on surface
Slope 9% 4 degrees	Moisture Dry C-1, wet 1-5, moist 5+	
Aspect swest	Root distrib. (over)	
Erosion None to slight		
Permeability slow		
Additional notes		

Many vertical and oblique slickensides in C1 and C2

Jameson
Mitchell

Vegetation
Pinyon-Juniper
Understory of
bluegrama, algerita

Form-SCS-232C-Soil Description 6-28-55

GPO 874130

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Table 4 cont'd.

Horizon	Depth	Color		Texture	Structure	Consistence			Reaction pH	Boundary	Roots	Clay Film	Pore
		Dry	Moist			Dry	Moist	Wet					
A1	0-1	7.5 YR 3/2	7.5 YR 3/2	Cobbly Clay (-)	2vfgr	5	fr	s-p	0 7.0	AS	Few Medium & large	0	many fin inter itual
C1	1-25	7.5 YR 3/2	7.5 YR 3/2	Clay	2msbk	vh	vfi	vs-vp	0 7.0	GW	"	Slick ensid	Few med exp
C2	25-27	5 YR 4/4	5 YR 3/4	Clay	2msbk	vh	vfi	vs-vp	ES 8.0	DW	"	Slick- ensid	Few med. exped
C2Ca	27-30	5 YR 8/4	5 YR 5/4	Cobbly Loam	1cpl	h	fi	ss-po	EV 8.0	AW	Occas - ional large		
DR	30 +	Basalt bedrock											

Table 5.

Soil type Toroweap Gravelly loam		File No.
Area AM-Central Coconino Co.	Date 10 July 61	Stop No.
Classification Reddish Brown		
Location		
N. veg. (or crop) Woodland		Climate Ppt. 14-16"
Parent material Mixed alluvium from chert, limestone, basalt, sandstone.		
Physiography Alluvial Fan		
Relief Convex-smooth	Drainage Well drained	Salt or alkali none
Elevation 6350	Gr. water Very deep	Stoniness Gravelly on surface
Slope 3%	Moisture 0-2" dry 2-8 moist 8+dry	
Aspect East	Root distrib. (over)	
Erosion None to slight		
Permeability Moderate		
Additional notes		

Jameson
Mitchell

Vegetation
Pinyon-juniper
Understory
of blue grama-
alkali

Form-SCS-232C-Soil Description 6-28-55

GPO 874130

U. S. GOVERNMENT PRINTING OFFICE: 1955 O—35

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Table 5 cont'd.

Horizon	Depth	Color		Texture	Structure	Consistence			Reaction	Boundary	Roots	Clay Film	Pores
		Dry	Moist			Dry	Moist	Wet	PH				
A11	0-½	5 YR 4/4	5 YR 3/4	Gravelly loam	1 cpl	l	vfr	so-po	6.5	AS	AF&M	0	Very fine interstitial
B12	½-2	5 YR 4/3	5 YR 3/3	Gravelly Clay Loam	vfgr	s	vfr	ss-ps	6.5	AS	AF&M	0	Many fine interstitial
B1	2-8	5 YR 4/4	5 YR 3/4	Gravelly Clay Loam+	1msbk	h	fi	s-p	7.5	CW	CF&M	Thin Discontinuous	Common Fine Tubular
B21	8-16	5 YR 3/4	5 YR 3/4	Gravelly Clay	2msbk	h	fi	s-p	7.5	CW	FVF	Thin Continuous	Common Fine Tubular
B22	16-30	2.5 YR 5/6	2/5 YR 4/6	Clay	3msbk	vh	vfi	vs-vp	7.5	Ci	FVF *FC	Thick Continuous	Few Fine Exped Tubular
C Ca	30-47+	5 YR 7/6	5 YR 6/8	Loam	Massive	s	fr	ss-ps	8.0		FVF FC	None	Few Fine Tubular
		*Roots exped. in the B22 horizon											

Table 6.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Springerville Stony Silty Clay		7-6-61	GN TCA		46

2. AREA	STATE	COUNTY	LOCATION SEC. T R
Black Canyon	Arizona	Mohave	

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Upland	3	X		E	5150'

4. CLIMATIC ZONE	LITTER TYPE
10" approx. ppc. (pinyon-juniper)	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Basalt cinders and ash					

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
None to slight		15		

7. TREES (Species)	TREES (Amount)	SHRUBS (Species)	SHRUBS (Amount)	FORBS (Species)	FORBS (Amount)	GRASSES (Species)	GRASSES (Amount)
Juniper		Cliffrose		Spanish bayonet		Black grama	
Pinyon		Algerita		Snakeweed		Red brome	
				Prickly Pear			
				Cholla			

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

Page 35a follows

FS 2500-1(3/89) SOIL DESCRIPTION (OVER)

Table 6 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Springerville Stony Silty Clay	Grumusol		

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed — D	COLOR — M (Moistur)	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES: Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS
A_1 0-2	10YR 5/3	10YR 3/3	Stony Silty Clay	2,vf, gr	sh S fi P		15% Stone	Many I-P Few f,R	e 8.0	AS	
C_1 2-25	7.5YR 5/2	7.5YR 3/2	Clay	2,c, sbk & ebk	eh VS vfi VP	thin cont.		Common, f-P Plentiful m-c, R	es 8.0	gw	Common Slickensides
C_{2ca} 25-30	7.5YR 5/4	7.5YR 4/4	Cindery Clay	M or 1,c, sbk	eh VS vfi VP	thin patchy	35% cinders	Many f,vf,t-P Occas.vf,R	ev 8.0		
	Many cinders Many common, prominent lime splotches and mycelia (D-7.5YR8/4)										
CD 30-41"+	7.5YR 7/4	7.5YR 6/4	Weakly to moderately cemented ash and cinders that are massive.								

~~Table 7.~~

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Babel (?)		7-6-61	GS TCA		4a

2. AREA	STATE	COUNTY	LOCATION SEC.	T	R
Black Canyon Area	Arizona	Mohave			

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Limestone Hills	5	✓		E	5150'

4. CLIMATIC ZONE	LITTER TYPE
10" approx. ppc. (pinyon-juniper)	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Limestone	Redwall				Slow

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Slight	--	50		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Juniper	20%	Cliffrose	5	Spanish bayonet	10	Black grama	3
Pinyon	15	Turbinella oak	10	Agave	2	Sideoats grama	2
		Mormon Tea	3	Prickly Pear	5	Blue grama c	T
				Snakeweed	25	Squirreltail	T
				PinOcusion Cactus	T	Red brome	T

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
			Clipped Area: ___ sq.ft.
Vegetation	Wt. (gm)	lb/acre	Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

Page 36a follows

Table 7 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Babel stony and rocky loam	Lithosol		

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR Dry, Moist, Crushed M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores		REACTION	BOUNDARY	PERCOLATION CLASS
A_1 0-3	10YR 5/3	10YR 3/3	stony loam	vl,f,pl → 2,vf,gr	sh ss fr sp		40% stone	plentiful f,R many, f-P		e 8.2	as	
C_1 3-7	10YR 5/3	10YR 3/3	loam/	1,f-m, sbk → 2,vf,gr	h ss fr sp		20% stone	plentiful, f, many f-L,P		es 8.2	aw	
Dr 7"/	Indurated limestone bedrock.											

Table 8.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Springerville stony clay		7-7-61	GW TCA		5b

2. AREA	STATE	COUNTY	LOCATION SEC.	T	R
Yavapai (Rubels Ranch)	Arizona	Yavapai			

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Upland	5	✓			5550'

4. CLIMATIC ZONE	LITTER TYPE
13" ppc (pinyon-juniper)	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Basalt					

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Slight	--	35	--	--

7. TREES (Species)	(Amount)	SHRUBS (Species)	(Amount)	FORBS (Species)	(Amount)	GRASSES (Species)	(Amount)
Juniper		Algerita		Snakeweed		Tabosa	
Pinyon				Prickly Pear			

About 60% of the surface is barren of vegetation. There is very little vegetative growth nearby this profile - nearest is 20.

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA

Clipped Area: ___ sq.ft.
Conv. Factor:

Vegetation	Wt. (gm)	lb/acre
Grass Per.		
Grass Ann.		
Forbs		
Shrubs		
Total		

Page 37a follows

Table 8 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Springerville stony clay	Grumusol		

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed		TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES				REACTION	BOUNDARY	PERCOLATION CLASS	
	D	M Mottling XXXXX				Clay Films	Stone Rock % Vol.	Roots Pores					
A_1 0-2	7.5YR 4/2	7.5YR 3/2	stony clay	3,vf,gr	sh vs fi vp		35%	Many I-P few, f, R		eo 7.5	as		
C_1 2-9	7.5YR 5/2	7.5YR 4/2	clay	3,m-c, sbk	eh vs vfi vp	thin cont.		few,f,T-P few,m-c,R		eo 8.0	cw		
C_2 9-22	7.5YR 5/2	7.5YR 4/2	clay	2,m-c, sbk	eh vs vfi vp	thin cont.		few,m-c,R few,f,R few,f,T-P		e 8.0	cs		Common slickensides
Cca 22-33	5YR 5/4	5YR 4/4	clay	vl,vc, sbk or masive	eh vs vfi vp	thin patchy		common, T,T-P few,m-L,R		e, except es on lime nodules 8.0		f,ld	
				many weathered basalt fragments.									
Drq 33"/m	Hit weathered basalt stone and boulders, and bedrock.												

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Dye. (Tent).		7-7-61	GW TCA		5a

2. AREA	STATE	COUNTY	LOCATION SEC.	T	R
Yavapai (Rube's Ranch)	Arizona	Yavapai			

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Upland					

4. CLIMATIC ZONE	LITTER TYPE
13" ppe (Pinyon-juniper)	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Sandstone	Supai				Slow

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Slight	None	5	--	--

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Juniper	20%	Yucca	1	Snakeweed	40	Blue grama	20%
Pinyon	10%	Berberis	1	Operntia	1	Black grama	3
						Ring Muhly	1
						Little seed	1
						Hilaria	2

Page 38a follows

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8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq. ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

FS 2500-1... ...) SOIL DESCRIPTION ...VER)

Table 9 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed		TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Cem	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS
	D	M									
A_1 0-3	5YR 5/6	5YR 3/4	loam	2,vf,gr	l ss vfr sp			Many vf,I-P abun. f,R	es 8.1	gs	
B_{21} 3-8	5YR 6/4	5YR 4/4	clay-	l,m,pr → 2,c,sbk	h s fi P	thin cont.		Many vf,f T-P plentiful f-m,R	ev 8.1	cw	
B_{22ca} 8-13	5YR 6/4	5YR 4/4	clay loam/	2,c,sbk	h s fi P	thin cont.		Many, vf-f,P plentiful f-m,R	ev 8.1	cw	
Cca 13-20	5YR 7/6	5YR 4/6	clay loam	M	h ss fi sp	thin patchy	10% stone	few,m,I-P occasional vf-m,R	ev 8.1	aw	
	m,2,P lime which is 5YR 7/6 moist; 5YR 8/3 dry										
Dr 20-25/	Decomposed calcareous sandstone which has some indication of iron stains.										

Table 10.

1. SOIL SERIES: Springerville very stony clay	MAP SYMBOL: 7-6-61	DATE: GJ TCA	BY:	PHOTO NO.	STOP NO.: 3b
2. AREA: Indian Mountain	STATE: Arizona	COUNTY: Yavapai	LOCATION SEC. T R		
3. LANDFORM: Gently sloping upland	SLOPE %: 2-3	SINGLE: ✓	COMPLEX	ASPECT: SE	ELEVATION: 5350'
4. CLIMATIC ZONE: 15" approx. ppt; pinyon-juniper					LITTER TYPE
5. PARENT ROCK: Basalt and cinders	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
6. EROSION: None to slight	GULLIES	SURFACE STONE AND ROCK %: 80		SALINES	ALKALI

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Juniper	75%			Prickly pear	3	Tabosa	10
Pinyon	5			Cholla	2	Ring muhly	2
				Spanish bayonet	3		

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8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA

Vegetation	Wt.(gm)	lb/acre
Grass Per.		
Grass Ann.		
Forbs		
Shrubs		
Total		

Clipped Area: ___ sq.ft.
Conv. Factor:

Much of the surface is covered with stones.

FS 2500-1(3/89) SOIL DESCRIPTION (OVER)

Table 10 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Springerville very stony clay	Grumusol		

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH		COLOR Dry, Moist, Crushed		TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Cem	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores		REACTION	BOUNDARY	PERCOLATION CLASS	
		D	M Matrix											
A_1	0-1	10YR 4/2	10YR 3/3	very stony clay	3,vf,gr	h s ff p		80% surface cover	many I-P few, vf, R		eo 7.6	as		
C_1	1-16	7.5YR 5/2	7.5YR 3/2	clay	2,m-c, abk	eh vs vff vp	thin cont.		few m-c R few vf, P		eo 7.8	gs		Common slickensides
C_2	16-25	7.5YR 5/2	7.5YR 3/2	clay	same as above	same as above	same as above		few vf T-P few f, R		e 8.0	cw		Same as above
C_3	25-32	7.5YR 5/2	7.5YR 4/2	clay	2,m-c, sbk	same as above	thin patchy		plentiful vf, R common vf, T-P		as 8.2			
CD	32"+	Weathered basalt rock with clay surfaces on cracks of rocks.												

Table 11.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Whipple		7-6-61	GW TCA		3a

2. AREA	STATE	COUNTY	LOCATION SEC. T R
Indian Mountain	ARIZONA	YAVAPAI	

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Alluvial fan	2	✓		NE	5200'

4. CLIMATIC ZONE	LITTER TYPE
15" approx. ppc. (pinyon-juniper)	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Mainly granite-some basalt					Slow

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Slight to moderate	occasional	<5		

7. (Species) TREES (Amount)	(Species) SHRUBS (Amount)	(Species) FORBS (Amount)	(Species) GRASSES (Amount)
Pinyon		Opuntia spp	Blue grama
Juniper			Ring muhly

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8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq. ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

FS 2500-1(3/59) SOIL DESCRIPTION

(OVER)

Table 11 cont'd. BACKY-

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Whipple Gritty loam / Lynx	Alluvial	✓	

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed: D	COLOR: M	TEXTURE	STRUCTURE	CONSISTENCE: Dry, Moist	CONSISTENCE: Wet, Com	SPECIAL FEATURES: Clay Films	SPECIAL FEATURES: Stone Rock % Vol.	SPECIAL FEATURES: Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS
A1 0-1	10YR 4/3	10YR 3/3	gritty loam /	2-3,vf, gr	s	s		few, f, R many I-P		eo 7.6	as	stratified with fine gravel lenses ½ - 3/4 inch wide
B1 1-9	7.5YR 4/2	7.5YR 3/2	loam	1,m-c, sbk	h	s		plenti. f, R many f-m, I-P		eo 8.0	cw	
B2 9-37	7.5YR 4/2	7.5YR 3/2	clay loam-	M or 1, c,sbk	vh	s		few f-m R Many f-m, T-P		eo 8.0	cs	
2b 37-48	7.5YR 5/4	7.5YR 4/4	gravelly clay loam /	M m	eh	vs	thin patchy	few m T-P		eo 8.0		
Dr 48" /	Grade into weathered granitic material and soil material which is a gravelly clay loam; same color as B_{2b} horizon.											

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Table 12.

1. SOIL SERIES: Thunderbird Stony Silty Clay	MAP SYMBOL	DATE: 7-5-61	BY GM: TCA	PHOTO NO.	STOP NO. 16
2. AREA: Hell Canyon	STATE: Arizona	COUNTY: Yavapai	LOCATION SEC. T R		
3. LANDFORM: Gently sloping upland	SLOPE %: 2	SINGLE: ✓	COMPLEX	ASPECT: SSE	ELEVATION: 4900'
4. CLIMATIC ZONE: Pinyon-juniper (upper Sonoran) 13" approx. ppc.					LITTER TYPE
5. PARENT ROCK: Basalt	FORMATION NAME	TEXTURE	MINERALS	FAULTING: None	WEATHERING: Slow
6. EROSION: None	GULLIES: None	SURFACE STONE AND ROCK %: 50		SALINES	ALKALI

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Utah juniper	4	Mimosa	3	Circium	1	Tobosa grass	85
		Flat top buckwheat	3			Silanion hydrox	1
		Opuntia	3			Bromes rubens	1
						Hordeum spp	2

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

FS 2500-1(3/89) SOIL DESCRIPTION

Table 12 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Thunderbird stony silt clay	Reddish-brown	to	Grumusol

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS	
A_1 0-2	7.5YR 4/2	7.5YR 3/2	silty clay	3,vf, gr	sh ss fi sp			few vf R many f-P	8.0	aw		
B_{21} 2-9	7.5YR 4/2	7.5YR 3/2	clay	2,m,pr → 2,m-cl sbk &abk	eh vs vfi vp	thin cont.		abund. f-m-R com, vf,f,T-P	8.2	gw		
B_{22} 9-17	7.5YR 4/2	7.5YR 3/2	clay	1,c-vc pr → 3,c,abk	eh vs efi vp	thin cont.		few f-m, R, few f-m,T-P	8.3	cw		common slicken-sides
B_{23} 17-22		5YR 4/4 with organic stains of 5YR 3/4	clay	2,m-c abk		thin cont.		common f-vf P plenti-ful vf-f R	8.2	aw		f,l,d lime nod-ules; common selen-sides
Dr 22"/	Hit bed rock at this depth, with ½ to 1/8 inch broken $CaCO_3$ layer just above the bedrock; lime is violently calcareous.											
	Between the B_{21} and B_{22} horizon is a large stone. In the A horizon continuing through the B_{21} horizon is another large stone. The surface has bedrock, boulders, stone and gravel (40-50%).											

Table 13.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Babel (?)		7-5-61	GW TCA		1a

2. AREA	STATE	COUNTY	LOCATION SEC. T R
Hell Canyon	Arizona	Yavapai	

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Upland	3	V		# E	4850'

4. CLIMATIC ZONE	LITTER TYPE
Pinyon-juniper - about 13" ppc.	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Limestone	Redwall	Fine			Slow

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Slight		40-50%		

7. (Species) TREES (Amount)	(Species) SHRUBS (Amount)	(Species) FORBS (Amount)	(Species) GRASSES (Amount)
Juniper	Cliffrose	Prickly Pear	Sand dropseed
	Mesquite	Snakeweed	Black grama
		Spanish bayonet	Blue grama
			Sideoats grama

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

Rock outcrop common; soil depth variable - ranges from 3 to 15 inches in pockets between rock outcrop.

Table 13 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Babel stony gravelly loam			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR M Mottling	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS
A_1 0-3	7.5YR 5/4	7.5YR 4/2	gravelly loam	vl,m,pl → 2,vf-f,gr	sh ss fr sp		40% gr	plenti. f-m,R many vf,I&T P	ev 8.4	cs	
C 3-5	7.5YR 5/4	10YR 3/4	loom	fl,f,sbk → 2,vf,fi gr	sh s fr p		10% stone	Abun. vf,fR Many vf,T-P	ev 8.2	as	
7	Tongues of this horizon to 7 inches - in cracks of Dr										
Dr_1 5-12	Fragmental (broken) violently calcareous (ev) Limestone with ½ in of secondary (weathered and deposited) lime deposition on top of this limestone which is broken. Broken IS has ½ inches linedrips on undersides.										
Dr_2 12"+	Limestone bedrock, violently calcareous (ev); has secondary material of ½ inches over this bedrock.										

Table 14.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Springerville stony clay		2-5-61	GW TCA		2 b
2. AREA	**STATE**	**COUNTY**	**LOCATION**		
White Mesa	Arizona	Navajo	SEC. 5 T miles N of Pinetown R		
3. LANDFORM	**SLOPE %**	**SINGLE**	**COMPLEX**	**ASPECT**	**ELEVATION**
Upland	2	✓		SE	6700'
4. CLIMATIC ZONE					**LITTER TYPE**
Pinyon-juniper, 13" approx. ppt.					
5. PARENT ROCK	**FORMATION NAME**	**TEXTURE**	**MINERALS**	**FAULTING**	**WEATHERING**
Basalt					
6. EROSION		**GULLIES**	**SURFACE STONE AND ROCK %**	**SALINES**	**ALKALI**
Slight			50		

(Species)	TREES (Amount)	(Species)	SHRUBS (Amount)	(Species)	FORBS (Amount)	(Species)	GRASSES (Amount)
Juniper	90%					Tobosa grass	2%

SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
			Clipped Area: ___ sq.ft.
Vegetation	Wt. (gm)	lb/acre	Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

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Table 14 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Springerville stony clay	Grumusol	✓	

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

	HORIZON AND DEPTH	COLOR Dry, Moist, Crushed: D	COLOR: M Mottling	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES: Clay Films	Stone Rock % Vol.	Roots Pores		REACTION	BOUNDARY	PERCOLATION CLASS	
A1	0-3	10YR 4/2	10YR 3/3	clay	3,vf-f, gr	sh s ef p		50%	f,f-m F many fine P		ea 8.2	cs		
A1	3-7	10YR 4/2	10YR 3/3	clay	vf,m,gr 2,c,sbk	vh vs vfi vp	thin cont.	5%	plenti.m,f F many, c, f-P		ea 8.2	as		
B2	7-43	10YR 4/2	10YR 3/3	clay	1,c-mc sbk	sh vs efi vp	thin cont.	trace	few,m-l,F common vf-P		ea 8.3	gu	few fine lime nod	many cracks,
B3ca	43-48	10YR 5/3	10YR 4/3	clay	m	sh vs efi vp	thin patchy	trace	vf,f,F		ev 8.3	cw		common silicaceous, lime nodules, fld.
		Weathered basalt fragments increase with depth.												
R	48"+	Basalt bedrock or boulders.												

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Table 15.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Cross		7-5-61			2a

2. AREA	STATE	COUNTY	LOCATION SEC. T R
Mesa Rim	Arizona	Navajo	

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Old alluvial plain and fan	2-3	X		S	4,700'

4. CLIMATIC ZONE	LITTER TYPE
13" annual ppt	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Quartzite, ss, chert, basalt with volcanic ash below					

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Slight	none	20		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Juniper	10%	Atriplex	T	Sphaeralcea	20	Bobcat	10
				Chaita	5	Blue grass	20
						Ring muhly	5

Most of the surface is barren of vegetation (60% barren surface)

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

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Table 15 con t'd

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Cross			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed		TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores		REACTION	BOUNDARY	PERCOLATION CLASS	
	D	M Mottling											
A_1 0-3	10YR4/4	10YR3/4	silty clay loam	3,vf,gr.	L S fr p		on surface 2mm	many f-p f,vf,		eo 8.0	CS		
B_{21} 3-8	10YR 3/3	10YR 3/4	clay	3,c-m,vk sbk	vh vs fi vp	thin cont.		plent m-c,R fine,f-p		eo 8.2	CW		
B_{22} 8-13	10YR 5/4	10YR 4/4	clay loam	2,m, sbk	vh vs fi vp	thin patchy	10% gravel	many vf, f-plent f-m,R		es 8.2			3,c,d lime sec,sah frags.
													lime conte quartzite andesite gravel
B_{ca} B-15	Caliche - soft unleached caliche shell in places; has f,m-roots; violently calcareous.												
B_2 15"+	Volcanic ash with lime shell on top; this is not related to the profile; violently calcareous.												

Table 16.

1. SOIL SERIES: Thunderbird	MAP SYMBOL	DATE: 7-18-61	BYTCA: DAJ	PHOTO NO.	STOP NO.: 6h
2. AREA: Rimrock plot	STATE: Arizona	COUNTY: Yavapai	LOCATION SEC. T R		
3. LANDFORM: Low Rolling Hills	SLOPE %: 2	SINGLE	COMPLEX	ASPECT: S	ELEVATION: 3900'
4. CLIMATIC ZONE: Semi-desert (juniper)					LITTER TYPE
5. PARENT ROCK: Basalt and cinders	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
6. EROSION: Slight	GULLIES: None	SURFACE STONE AND ROCK: 30 %		SALINES	ALKALI

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Utah juniper	5%	Snakeweed	60%			Tobosa	5%
		Prickly Pear	15				
		Accacia	10				
		Blackbush	5				

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

page 45a follows

Table 16 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Thunderbird stony dry loam			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

	HORIZON AND DEPTH	COLOR Dry, Moist, Crushed: D	COLOR Dry, Moist, Crushed: M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES: Clay Films	SPECIAL FEATURES: Stone Rock % Vol.	SPECIAL FEATURES: Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS
A_1	0-1	10YR 5/2 gr. brn.	10YR 3/2 v.drk.gr. brown	stony gritty cl/	1,m,sbk → 2,vf,gr	h s / fi p		20% fine cinders	f,f,R com,vf,I-P	eo 8.4	as	
B_2	1-8	7.5YR 5/2 brown	7.5YR 4/2 brn.-drk. brown	clay	1,m,pr → 2,m-c,sbk	eh s / vfi p	thin patchy	10% cobble 8% vf, cinders	pl,vf-f,R many vf-f, TBP	eo 8.0	aw	
C	8-18	Cinders and decomposed basalt					thin patchy in cracks		f,vf,R	eo 7.6		
Dr	18"/	Basalt bedrock or boulders.										

Table 17.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Retriever loam and stony loam		7-6-61	TCA DAJ		6 a

2. AREA	STATE	COUNTY	LOCATION SEC.	T	R
Rimrock plot	Arizona	Yavapai			

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Undulating mesa tops	1-2			SW	3900'

4. CLIMATIC ZONE	LITTER TYPE
H Semi-desert juniper	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Limestone	Verde Lake				

6. EROSION	GULLIES	SURFACE STONE AND ROCKS	SALINES	ALKALI
Slight	None	10% ½ gr.; occasional stone		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Cantia	45%	Snakeweed	45%	Astragulus	T		
Utah Juniper	5%	Black brush	5%				
		Algerita	T				

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

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Table 17 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Retriever loam	Calcisol		

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS	
A_1 0-1	10YR 8/2 white	10YR 6/2 light brn-gray	loam/	1/4" vesicular vl,f-m	sh fr		10% fgr	Many very fine	ev 8.4	as		
				sbk → 2vl-f,gr				I-P few v f R				
A_{12} 1-7	10YR 7/2 light gray	10YR 5/3 brown	clay loam-	1,c,sbk → 2,vf-f, f.gr.	sh ss fr sp		10% very f.gr.	plent. vf-m abund	ev 8.3	cw		
								f-m, F-P				
Cca 7-10	10YR 8/1 white	10YR 7/2 light gray	loam	vl,f,sbk → 1,vf,gr	sh ss fr sp		5% f.gr.	few f, R few fn P	ev 8.3	cw		Much lime
Cca_2 10-25	10YR 7/2 light gray	10YR 6/2 light brn-ish gray	cobbly loam	Massive	sh ss fr sp		30% gr. & co	few f-m R few, f P	ev 8.2	ac		
Dr 25/	Verde Lake Bed Formation											
	In the 10 to 25 inch layer the top of the horizon has a hard indurated layer 2 to 6 inches thick; the remainder of the horizon has slightly indurated material consisting mainly of cobbles.											

Table 18.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Thunderbird		7-18-61	DAJ TCA		7b

2. AREA	STATE	COUNTY	LOCATION SEC. T R
Sand Rock Draw	Arizona	Yavapai	

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Gently sloping upland	2	✓		W	6300'

4. CLIMATIC ZONE	LITTER TYPE
Pinyon-juniper vegetative type	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Basalt					

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
None to Slight		15		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Alligator juniper	15			Snakeweed	40	Blue grama	40
Ponderosa pine	3						
Gamble oak	2						

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			Clipped Area: ___ sq.ft.
Vegetation	Wt. (gm)	lb/acre	Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

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Table 18 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Thunderbird cobbly clay loam	Reddish-chestnut		Grumusol

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)
Moderately slow	Slow			

	HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS	
1	0-2	10YR 5/3 brown	10YR 3/3 dk.brn.	cobbly cl	1,vf,gr	sh s fr p		15% cob.	many,vf-f,R " I-P	eo 7.2	AS		¼"vesicular layer
2	2-11	7.5YR 4/2 brn.-dk.brn.	7.5YR 3/2 dk.brn.	clay	1,f-m,pr → 3,f-m,sbk	vh vs vfi vp	thin patchy		many,vf-f,R " vf,T&I-P	eo 7.8	aw		
1	11-36	7.5YR 4/2 brn.-dk.brn.	7.5YR 3/2 dk.brn.	clay	3,c,abk	eh vs efi vp	thin cont.		pl,f-m,R com,VF,T-P	eo 7.8	gs		Comm. slickensided cracks up to 1 inch wide.
2	36-43	7.5YR 5/4 brown	7.5YR 4/4 brn.-dk.brn	fine g clay	2,m,abk	eh vs efi vp	thin patchy	15% f. gr.	few, m, R many, vf,I& T-P	eo 8.2	aw		Decomposed weathered basalt with little or no cracks.
r	43"+	Hit basalt bedrock or boulders.											

Table 19.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Hogg		7/18/61	TCA DAJ		7a

2. AREA	STATE	COUNTY	LOCATION
Sand rock draw	Arizona	Yavapai	SEC. T R

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Rolling upland	X			NE	6250

4. CLIMATIC ZONE	LITTER TYPE
Pine-juniper transition	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Cherty limestone	Kaibab				

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Slight	None	15		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Ponderosa pine	25	Snakeweed	5			Blue grama	20
Gambles oak	25						
Alligator juniper	25						

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

o checkthis soil with Toroweap

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Table 19 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Hogg loam			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed — D	COLOR — M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Wet	CONSISTENCE Moist, Cem	SPECIAL FEATURES Clay Films	SPECIAL FEATURES Stone Rock % Vol.	SPECIAL FEATURES Roots Pores	SPECIAL FEATURES	REACTION	BOUNDARY	PERCOLATION CLASS	
A few scattered needles on the surface.														
A_{11} 0-2	10YR 5/2 gr.brn.	10YR 2/3 vry.dk.brn.	gritty loam	vl,vf,pl 2,vg,gr	sh fr	SS SP		10% gravel	abun.,vf-f,R many,vf,I-P		eo 7.2	AW		
A_{12} 2-5	10YR 5/1 gray	10YR 2/2 vry.dk.brn.	clay loam	2,m,sbk 1,f,gr	h fr	S SP		5% f gr	pl,f-m,R many,vf I-P few,f,t-P		eo 7.4	GW		
B_{21} 5-14	5YR 4/3 rd.brn.	5YR 3/3 dk,red.brn.	clay	2,m,pr 2,c,abk	rh vfi	VS P	thick cont.	25% f.gr.	common,f,I-P? f,mod,I-P pl,f&m,R		eo 7.4	GW		
B_{22} 14-28	5YR 5/4 rd. brn.	5YR 4/4 rdd.brn.	clay	1-2,c abk	sh efi	VS VP	thick cont.	25% very f.gr.	few,m-I,R few,vf I-P		eo 7.6	AI	½" wide cracks extending from above horizon; common slikensides few very fine Mn shot; very compacted	
D_r 28"+	Limestone; soil extends into cracks of D_r. The D_r rises to within 6 inches below the soil surface and is occasionally exposed.													

Table 20.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Springerville		7-19-61	DAJ TCA		8b

2. AREA	STATE	COUNTY	LOCATION SEC.	T	R
Buckhead Mesa	Arizona	Gila			

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Gently sloping mesa upland	2		✓	S	5000'

4. CLIMATIC ZONE	LITTER TYPE
Juniper-chaparral (20 inches)	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Basalt, some quartzite					

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
Moderate	None	70		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Utah Juniper	60%	Agave	2			Sideoats grama	T
Alligator juniper	30	Snakeweed	5				
		Prickly pear	3				

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq. ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

Page 49a follows

Table 20 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Springerville very stony clay	Grumusol		

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed: D	COLOR: M (Moist)	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES: Clay Films	Stone Rock % Vol.	Roots Pores		REACTION	BOUNDARY	PERCOLATION CLASS	
C_1 0-2	7.5YR 5/4 brown	7.5YR 3/2 dr, brown	very s clay	1-2,m, sbk	vh s fi p	thin patchy	70% st. & cob.	f,vf, T-P		eo 7.0	as		
C_2 2-15	7.5YR 4/2 brn. to dk brown	7.5YR 3/2 dk. brown	clay	1-2,m to c,abk	eh vs vf vp	thin cont.		pl,m&l,T-R f,vf,P		eo 7.2	gw		1/8"-1/4" cracks
C_3 15-30	7.5YR 4/2 brown to drk. brown	7.5YR 3/2 drk. brn.	clay	1,vc, abk	eh vs vfi vp	thin patchy	5% cob & stone	f,f,R f,vf,P		eo 7.5	ai		1/2" cracks few slic ensides; pressure faces prominent
Dr 33-36+"	Basalt boulders with some soil from above horizon between boulders.												

Table 21.

1. SOIL SERIES: Buckhead (tentative name applied during desc.)	MAP SYMBOL	DATE: 7/19/61	BY: DAS TCA	PHOTO NO.	STOP NO.: 8a
2. AREA: Buckhead Mesa	STATE	COUNTY	LOCATION SEC. T R		
3. LANDFORM: Gently sloping upland	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
4. CLIMATIC ZONE: Chapparal - Pinyon-Juniper type (possibly 20"pp)					LITTER TYPE
5. PARENT ROCK: Tonto Group (Mantazal Quartzite)	FORMATION NAME	TEXTURE	MINERALS	FAULTING: much in place	WEATHERING
6. EROSION: None to slight	GULLIES	SURFACE STONE AND ROCK: 50 % gravel and cobble		SALINES	ALKALI

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Utah Juniper	10	Turbinella Oak	30	Snakeweed	T	Hairy grama	5
Alligator juniper	20	Manzanita	25			Side oats grama	T
Pinyon pine	5	Skunk bush	T			3-Awn	T
Emory oak	5						

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt.(gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

Page 50a follows

Table 21-cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Buckhead cobbly sandy loam			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed — D	COLOR Dry, Moist, Crushed — M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	SPECIAL FEATURES Stone Rock % Vol.	SPECIAL FEATURES Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS	
A_1 0-1	7.5YR 5/4 brown	7.5YR 3/2 dk.brown	cobbly SL	1,f,sbk 1,vf, gr→	s VSS fr SP		50% cobble	pl,vf,R many,f, I-P	eo 7.2	AS		
B_1 1-4	7.5YR 4/2 brown-dk. brown	7.5YR 3/2 dk.brown	gravelly SCL	2,m,sbk, → 2,vf-f1gr	sh SS fi SP	thin patchy	15%	many,vf,R many,f,I-P	eo 7.0	CS		
B_{22} 4-14	5YR 4/6 yel-rd.	5YR 4/6 yel.-rd.	f.s. C	1,f-m,pr → 2-m,abk	vh S vfi P	thick cont.	10%gr an occ.cob	pl,f-m,R many,f, I&TP	eo 6.8	AI		Slightly decomp. roots
D,14-19"+	Bedrock with soil from horizon above in between cracks of rock.											

Table 22.

1. SOIL SERIES: Springerville	MAP SYMBOL:	DATE: 7-20-61	BY: FCA MM	PHOTO NO.:	STOP NO.: 9b
2. AREA: Carrizo	STATE: Arizona	COUNTY: Gila	LOCATION SEC. T R		
3. LANDFORM: Gently sloping upland	SLOPE %: 2	SINGLE	COMPLEX	ASPECT: N	ELEVATION: 5300'
4. CLIMATIC ZONE: Juniper-chaparral vegetative type					LITTER TYPE:
5. PARENT ROCK: Basalt	FORMATION NAME:	TEXTURE:	MINERALS:	FAULTING:	WEATHERING:
6. EROSION: Slight	GULLIES:	SURFACE STONE AND ROCK %: 40		SALINES:	ALKALI:

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Utah juniper	98%	Snakeweed	1%	Sacahiste	T	Blue grama	1%
Pinyon	T					Sideoats grama	T

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq. ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

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Table 22 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Springerville stony clay			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)

	HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR M XXXXX Mottling	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS	
1	0-2	5YR 4/4 rd-brn	5YR 3/4 dk. rd.brn.	stony clay	3,vf-f, gr	l s fi p			f,vf-R	e 8.0	es		
2	2-6	7.5YR 3/2 dk. brn.	7.5YR 3/2 dk. brn.	clay	2,c,sbk	vh s vfi vp	thin patchy		f,m-L,R f,vf,I-P	eo 8.0	cw	few, vf,mn shot	
3	6-34	7.5YR 4/4 brn.-dk.brn.	7.5YR 3/2 dk.brn.	clay	vl,vc, sbk or massive	eh vs efi vp	thin patchy or pressure faces		f,m-L, R occasional root channel f,vf, I-P	e(es at lime nodules) 8.0	aw	few,fv,f Mn shot up to 1mm;many vf,f, and m (up to 3mm)lime nodules; common slickensides	
r	34+"	Boulders or bedrock.											

Table 23.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Ruin Corduroy Loam (Tentative)		7-20-61	MM TCA		9a

2. AREA	STATE	COUNTY	LOCATION SEC.	T	R
Carrizo	Arizona	Gila			

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Nearly level old alluvial fan	1		✓		5300'

4. CLIMATIC ZONE	LITTER TYPE
Juniper-chaparral	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Alluvium from Supai - Coconino - Basalt					

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
None	None	5		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Utah juniper	55	Turbinella oak	10	Buckwheat	2	Sideoats grama	5
Pinyon	15	Prickly pear	1	Groundsel	2	Blue grama	2
Emory Oak	T	Cliff rose	2	Sacahuiste	2		
		Manzanita	2				
		Snakeweed	2				

8. SUITABILITY ESTIMATE FOR	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

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Table 23 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Corduroy Loam			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS	
A_{11} 0-2	7.5YR 5/2 brown	7.5YR 3/2 dark brown	loam	3,vf-f, gr	s ss fr sp		10% gr	Many vf- R	ev 8.0	as		
								many vf, I-P				
A_{12} 2-8	5YR 5/3 reddish-brn.	5YR 3/4 dark rd.-brn	cl	1,f,sbk → 2,f,gr	sh s fr sp		1% round & angular	Many P vf,I-P	ev 8.1	cs		
							gravel 1"-2" in dia.					
C_1 8-26	5YR 7/4 pink	5YR 5/4 reddish-brn.	cl	m	vh s fi sp		Same as above	Few,vf I-P Few f-m,R	ev 8.2	cs		Worm holes and castes
C_2 26-40	5YR 7/4 pink	5YR 5/4 reddish-brn	cl	m	h s fr sp		40% angles gravel	Many v few R few,fine I-P	ev 8.4	as		c i d line viens
C_3 or D 40-54+	5YR 5/4 reddish-brn.	5YR 4/4 reddish-brn.	→	m	eh			Medium occ R Very few P	ev 8.4			Segregate lime on seams
				Weathered sandstone and occasional rnd balls.								

Table 24.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Thunderbird clay		7-19-61	TCK DAJ		10 b

2. AREA	STATE	COUNTY	LOCATION SEC. T R
Lone Pine	Arizona	Navajo	

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Gently sloping upland	1-2				6400

4. CLIMATIC ZONE	LITTER TYPE
Juniper vegetative type zone	

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Basalt					

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
None				

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
One seeded juniper	30%	4 wing salt bush	T			Galleta	20%
Utah juniper	10	Snakeweed	5%			Blue grama	25
		Prickly Pear	T			Three Awn	5
		Algerita	5			Sideoats grama	T

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: ___ sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

Page 53a follows

Table 24 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL	OR INTEGRADE TO
Thunderbird clay			

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE *(Ft.)*

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed: D	COLOR: M Moistened	TEXTURE	STRUCTURE	CONSISTENCE Dry, Wet	CONSISTENCE Moist, Com	SPECIAL FEATURES: Clay Films	SPECIAL FEATURES: Stone Rock % Vol.	SPECIAL FEATURES: Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS	
A_1 0-1	7.5YR 5/4 brown	7.5YR 3/2 dk brown	clay-	3,vf,gr	L fr	s sp		10% (3% f gr)	f,f,R	eo 8.0	as		thin mul vh; cracks in surfac
B_2 1-6	5YR 5/4 brown	5YR 3/4 drk.brn.	clay	1,m,pr → 2,m-c,sbk	vh fi	s p	thin patchy ridges		pl,f,R many f,vf,f,m T-P	e 8.2	gw		
B_{2ca} 6-16	5YR 5/4 brown	5YR 4/4	clay	1,c-vc, pr → 1,c,sbk & abk	vh fi	vs p	thick cont.	2% gr	common,ftom tubular P pl,f-m,R	es 8.2	aw	splotches influence of cinders	few slic-ensides, c,l,p lim
C_{ca} 16-25	5YR 7/6 reddish-yel.	5YR 5/6 strong brn.	gravelly clay	massive	sh fi	s p		20% limy coated gravel fine to large	Common,f, interstidal P,few m,tub-ular pores	ev 8.2	aw	many organci stures,c,2,p lime splotches	
25½"	Cemented ash												

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Table 25.

1. SOIL SERIES	MAP SYMBOL	DATE	BY	PHOTO NO.	STOP NO.
Snowflake		7-19-61	DAJ TCA		10a

2. AREA	STATE	COUNTY	LOCATION SEC. T R
Lone Pine	Arizona	Navajo	

3. LANDFORM	SLOPE %	SINGLE	COMPLEX	ASPECT	ELEVATION
Gently sloping upland	1-2	X		SW	6325'

4. CLIMATIC ZONE	LITTER TYPE

5. PARENT ROCK	FORMATION NAME	TEXTURE	MINERALS	FAULTING	WEATHERING
Tiertiery outwash of quartzite, chert, basalt, and		sandstone			

6. EROSION	GULLIES	SURFACE STONE AND ROCK %	SALINES	ALKALI
None to slight		40		

7. (Species) TREES	(Amount)	(Species) SHRUBS	(Amount)	(Species) FORBS	(Amount)	(Species) GRASSES	(Amount)
Juniper	35			Yucca	T	Blue grama	50
Pinyon	5			Prickly Pear	T	3-Awn	5
				Snakeweed	5		

8. SUITABILITY ESTIMATE FOR ↓	CLASSES I	II	III	IV	V
Erosion Hazard					
Water Storage Potential					
Range Potential					
Timber Potential					

9. MEASURED INTERPRETATIVE DATA			
Vegetation	Wt. (gm)	lb/acre	Clipped Area: sq.ft. Conv. Factor:
Grass Per.			
Grass Ann.			
Forbs			
Shrubs			
Total			

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Table 25 cont'd.

10. SOIL TYPE OR PHASE	CLASSIFICATION	MODAL / OR INTEGRADE TO
Sn owflake gravelly loam	Reddish-Chestnut	

11. INFILTRATION	PERCOLATION	STORAGE	DRAINAGE CLASS	WATER TABLE (Ft.)
Mod. Rapid	Mod. Rapid		Well	Deep

HORIZON AND DEPTH	COLOR Dry, Moist, Crushed D	COLOR M	TEXTURE	STRUCTURE	CONSISTENCE Dry, Moist Wet, Com	SPECIAL FEATURES Clay Films	Stone Rock % Vol.	Roots Pores	REACTION	BOUNDARY	PERCOLATION CLASS
A_1 0-2	7.5YR 5/4 brwn.	7.5YR 3/2 dk. brwn.	gravelly loam	2,vf,gr	l SS fr SP		40% fine gr	many vf,R vl.	es 8.4	AS	
B_1 2-9	7.5YR 4/2 brwn to dk.brwn.	7.5YR 3/2 dk.brwn.	gravelly clay loam	2,m,sbk → 2,vf-f,gr	sh SS fr SP		20% gr.	plentiful, vf,R many,vf I-P few,vf,T-P	e 8.2	GW	
B_1 9-16	5YR 5/4 brn.	5YR 3/4 brn.to dk.brn.	gravelly sandy clay	1,f-m sbk→ 2,vf,gr	h S fi P	very thin patchy on ridges	20% gr	plentiful, f,R, many f,I-P few,f,T-P	es 8.4	GW	
	There are e,i,p lime splotches on the surface of soil peds; gravel is lime coated										
B_{2ca} 16-29	5YR 6/6 rd.-yel.	5YR 4/6 strong brn.	gravelly clay	vf,f-m, sbk → 2,vf,gr	vh S fr P	thin patchy	25% gr	plentiful, m,R many,vf,I-P common,vf-f-t-P	ev 8.4	CI	
	There are e,i,p, lime splotches throughout peds; many lime coated gravels										
C_{ca} 29-56"+	5YR 7/4 pink	5YR 5/6 strong brn.	gravelly sandy clay	m	vh S fr P		60% gr	few,f-m,R many vf,I-P few,vf-f,T-P	ev 8.6		Much lime

Table 26-MECHANICAL ANALYSIS OF SOILS

FROM SITE POTENTIAL STUDY PLOTS

Location	Series	Horizon (Inches)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Texture
Black Canyon	Springerville	0-2	14	25.3	37.6	37.1	clay loam
		2-25	0	19.9	30.2	49.9	clay
		25-30	60	31.5	29.2	39.3	clay loam +
Black Canyon	Babbel	0-3	42	43.6	38.1	18.3	loam
		3-7	22	32.6	42.6	24.8	loam
Yavapai	Springerville	0-2	25	11.8	39.8	48.4	clay -
		2-9	0	14.8	31.1	54.1	clay
		9-22	0	10.6	31.6	57.8	clay
		22-33	6	12.5	28.2	59.3	clay
Yavapai	Yavapai?	0-3	11	30.4	32.7	36.9	clay loam
		3-8	1	21.5	29.3	49.2	clay
		8-13	30	18.9	28.4	52.7	clay
		13-20	44	28.0	21.9	50.1	clay
Indian Mountain	Springerville	0-1	25	10.2	36.6	53.2	clay
		1-16	0	7.9	34.6	57.5	clay
		16-25	0	8.9	33.6	57.5	clay
		25-32	9	16.9	29.1	54.0	clay
Indian Mountain	Whipple	0-1	13	40.1	31.0	28.9	clay loam
		1-9	19	49.0	24.1	26.9	sandy clay loam
		9-37	5	42.1	31.5	26.4	loam-clay loam
		37-48	14	38.5	25.9	35.6	clay loam
Hell Canyon	Thunderbird	0-2	32	18.6	41.6	39.8	silt,clay loam+
		2-9	0	15.3	29.5	55.2	clay
		9-17	0	13.7	29.3	57.0	clay
		17-22	0	10.7	30.7	58.6	clay

MECHANICAL ANALYSIS OF SOILS

FROM SITE POTENTIAL STUDY PLOTS

Location	Series	Horizon (Inches)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Texture
Hell Canyon	Babbel	0-3	50	31.0	41.9	27.1	loam-clay loam
		3-5	25	29.3	42.6	28.1	clay loam -
Witty Tom	Springerville	0-3	15	11.5	38.9	49.6	clay -
		3-7	6	8.3	36.6	55.1	clay
		7-43	0	9.9	31.3	58.8	clay
		43-48	2	11.6	27.4	61.0	clay
Witty Tom	(Ash D)	0-3	22	22.6	43.8	33.6	clay loam
		3-8	1	16.4	33.2	50.4	clay
		8-13	13	19.1	36.2	44.7	clay
AA	Springerville	0-1	62	18.3	29.9	51.8	clay
		1-26	4	13.8	25.2	61.0	clay
		27-39	67	28.4	27.4	44.2	clay
AA	Toro Weap	0-2	36	35.3	34.7	30.0	clay loam
		2-8	11	26.1	30.9	43.0	clay
		8-16	12	27.4	26.5	46.1	clay
		16-30	9	17.7	25.6	56.7	clay
		30-47	6	25.2	25.9	48.9	clay
Babbitt Lake	Thunderbird	0-2	36	24.3	54.1	21.6	silt loam
		2-13	1	12.8	38.1	49.1	clay -
		13-17	27	10.8	32.0	57.2	clay
		17-24	15	19.0	32.7	48.3	clay
Babbitt	Winona	0-1	62	21.4	53.5	25.1	silt loam +
		1-7	70	15.8	53.4	30.8	silt-clay loam
		7-12	76	22.3	48.9	28.8	clay loam -
Rimrock	Thunderbird	0-1	29	43.3	28.4	28.3	clay loam -
		1-8	7	28.7	26.8	44.5	clay
		8-18	63	49.1	31.7	19.2	loam
Rimrock	Retriever	0-1	32	36.6	32.7	30.7	clay loam
		1-7	30	25.1	33.6	41.3	clay -
		7-10	26	18.1	32.3	49.6	clay
		10-25	53	19.7	31.2	49.1	clay

Table 26 Cont'd.

MECHANICAL ANALYSIS OF SOILS

FROM SITE POTENTIAL STUDY PLOTS

Location	Series	Horizon	Gravel	Sand	Silt	Clay	Texture
		(Inches)	(%)	(%)	(%)	(%)	
Sand Rock Draw	Thunderbird	0-2	45	11.4	50.1	38.5	Silty clay loam
		2-11	1	10.3	47.9	41.8	silty clay
		11-36	1	8.2	29.1	62.7	clay
		36-43	8	9.6	30.9	59.5	clay
Sand Rock Draw	Hogg	0-2	29	21.8	49.4	28.8	clay loam -
		2-5	14	21.3	46.6	32.1	clay loam
		5-14	1	10.9	29.8	59.3	clay
		14-28	3	13.6	22.1	64.3	clay
Buck Head Mesa	Springerville	0-2	56	18.5	33.3	48.2	clay
		2-15	0	14.8	30.3	54.9	clay
		15-30	0	15.7	28.9	55.4	clay
Buck Head Mesa	Buck Head (new name)	0-1	70	58.3	25.2	16.5	sandy loam
		1-4	7	52.2	18.7	29.1	sandy clay loam
		4-14	15	42.0	10.4	47.6	clay
Lone Pine	Thunderbird	0-1	19	29.0	33.3	37.7	clay loam
		1-6	0	19.8	28.9	51.3	clay
		6-16	0	18.2	26.2	55.6	clay
		16-25	63	18.9	22.9	58.2	clay
Lone Pine	Snowflake	0-2	40	60.5	21.8	17.7	sandy loam
		2-9	24	50.9	24.5	24.6	sandy clay loam
		9-16	24	47.9	17.7	34.4	sandy clay loam+
		16-29	47	48.5	15.7	35.8	sandy clay loam+
		29-56	54	60.6	12.9	26.5	sandy clay loam
Carrizo	Springerville	0-2	10	12.8	39.6	47.6	clay
		2-6	10	10.1	38.9	51.0	clay
		6-34	0	9.0	35.4	55.6	clay
Carrizo	Corduroy	0-2	14	33.1	40.0	27.0	loam-clay loam
		2-8	11	29.7	40.9	29.4	clay loam
		8-26	42	26.0	39.5	34.5	clay loam
		26-40	66	39.4	34.3	26.3	loam +
		40-54	74	27.5	49.8	22.7	loam-silt loam

Chemical Analysis

Soil samples were collected from 0 to 10 inches on all plots and analyzed with La Motte soil test kits (table 27).

Pot Tests

Soil from the surface 10 inches of each plot was brought into the greenhouse for pot tests. For each soil 12 polyethylene pots were filled with 1500 gms. soil each. Corn and Bouteloua curtipendula were the test plants. One-third of the pots were fertilized with N equivalent to 100 lb./acre and one-third with N, P, and K each at 100 lb./acre. All pots were brought to approximately field capacity with distilled water and re-watered every other day.

Data from these tests are summarized in tables 27-30. Only 17 soils are summarized here. Data on other soils is in the study files, but no interpretation was possible because of high variance and few replications.

PRECIPITATION

At each plot pair a precipitation storage gage was established. Readings were taken at least twice yearly. Gages were changed with oil and ethylene glycol in the winter and oil alone in the summer. Precipitation records are given in tables 56-67.

Table 27.--Nutrient analysis of soils from site potential study plots[1/]

Location	Series	P lb./ac.	K lb./ac.	NO_3 lb./ac.	NH_3 lb./ac.	NO_2 lb./ac.	Ppm Ca	Mg	Mn	Al	SO_4	Fe
Babbitt Lake	Thunderbird	162	215	< 3	VL	< 1	14,000+	VL	L	L	< 50	None
	Winona	165	142	8	VL	<1	14,000	VL	L	L	< 50	Low
AA	Springerville	200	150	3	VL	<1	2,800	VL	L	MH	<50	Slight
	Toroweap	188	180	< 3	VL	<1	2,362	VL	L	VL	<50	None
Black Canyon	Springerville	200	185	12	VL	<1	7,000	VL	L	VH-	<50	Low
	Babble											
Yampai	Springerville	150	215	8	VL	<1	6,750	VL	VL	H	<50	Low
	Yampai	42	152	3	VL	<1	14,000+	VL	VL	M+	<50	None
Indian	Springerville	175	220	< 3	VL	<1	3,500	VL	L+	L	<50	Low
Mountain	Whipple	200+	190	28	VL	<1	2,900	VL	VL	ML	<50	None
Hell Canyon	Thunderbird	200	200	8	VL	<1	1,750	VL	L	L	<50	Slight
	Babble	200+	210	<3	VL	< 1	7,000	VL	ML-	M	<50	Low
Witty Tom	Springerville	200	188	<3	VL	<1	5,000	VL	L	VH-	<50	Slight
	(Ash D)	200+	205	8	VL	<1	7,000	VL	L	M	<50	Low
Rimrock	Thunderbird	200+	210	20	VL	<1	5,000	VL	L	M+	< 50	Low
	Retriever											
Sandrock	Thunderbird	200	125	<3	VL	<1	2,500	VL	ML	VL	<50	None
Draw	Hogg											
Buckhead Mesa	Springerville	175	150	< 3	VL	< 1	2,500	VL	ML	M	<50	Slight
	Buckhead	52	135	< 3	VL	< 1	1,000	VL	ML	VL	<50	Low
Carrizo	Springerville	200	177	3	VL	< 1	5,000	VL	L	L	<50	Low
	Corduroy	160	152	3	VL	< 1	14,000+	VL	L-	L	<50	None
Lone Pine	Thunderbird	137	195	< 3	VL	< 1	6,750	VL	L	M	<50	None
	Snowflake	170	132	3	VL	< 1	1,750	VL	ML	VL	<50	Low

1/ Average of two determinations, 0 to 10 inch depth. The following results apply to all soils tested: NH_3, very low; NO_2, less than 1 lb./ac.; Mg, very low; SO_4, less than 50 lb./ac.

Table 27.--Corn weights from pot tests

Location	Sample No.	CK	N	NP	Sum with N	Sum all treatments
Tortugas						
Limestone Canyon	1	1.1	3.1	1.2	4.3	5.4
Hell Canyon	2	2.7	4.9	4.6	9.5	12.2
Babbitt Lake	3	1.4	3.7	3.7	7.4	8.8
Black Canyon	4	1.4	3.0	3.7	6.7	8.1
	Sum	6.6	14.7	13.2	27.9	34.5
	Mean	1.650	3.675	3.300	3.487	2.875
Gem						
Lone Pine	5	1.1	2.2	3.6	5.8	6.9
Sandrock Draw	6	1.1	4.7	4.5	9.2	10.3
Rimrock	7	1.1	5.7	5.9	11.6	12.7
Babbitt Lake	8	1.4	3.2	2.4	5.6	7.0
Limestone Canyon	9	0.9	4.5	3.9	8.4	9.3
Hell Canyon	10	2.7	6.0	8.6	14.6	17.3
	Sum	8.3	26.3	28.9	55.2	63.5
	Mean	1.383	4.383	4.816		3.527
Springerville						
Indian Mountain	11	0.7	2.9	2.2	5.1	5.8
Buckhead Mesa	12	0.6	1.8	2.1	3.9	4.5
Black Canyon	13	0.5	1.4	1.6	3.0	3.5
Witty Tom	14	1.3	3.2	2.4	5.6	6.9
AA	15	1.2	3.0	4.1	7.1	8.3
Carrizo	16	0.6	0.9	5.1	6.0	6.6
Yampai	17	1.3	2.8	3.0	5.8	7.1
	Sum	6.2	16.0	20.5	36.5	42.7
	Mean	0.885	2.285	2.928		2.033
Grand sum		21.1	57.0	62.6	119.6	140.7
Grand mean						1.37

Table 29.--Corn weights - Analysis of variance

Source of variation	Degrees of freedom	Sums of squares	Mean square	F
Total	101	82.2468		
Soils	16	30.4884		
Series	(2)	10.9290	5.4645	3.91*
Samples	(14)	19.5594	1.3971	9.84***
Fertilizers	2	29.8276		
Nitrogen	(1)	29.3664	29.3664	63.43***
Phosphorus	(1)	0.4612	0.4612	1
Replications	1	0.0165	0.0165	1
Soils x F	32	14.8158	0.4630	
Ser x F	(4)	3.4280	0.8570	
Ser x N	(2)	2.7438	1.3719	3.37*
Ser x P	(2)	0.6843	0.3422	1
Sam x F	(28)	11.3878	0.4067	
Sam x N	(14)	3.9982	0.2856	2.01*
Sam x P	(14)	7.3896	0.5278	3.72***
Pooled error	50	7.0984	0.1420	

* Indicates significance at .05 level
*** Indicates significance at .001 level

Table 30.--Bouteloua curtipendula weights from pot tests

Location	Sample No.	CK	N	NPK	Sum with N	Sum samples
		Milligrams				
Tortugas						
Limestone Canyon	1	40	65	70	135	175
Hell Canyon	2	170	150	110	260	430
Babbitt Lake	3	80	75	110	185	265
Black Canyon	4	60	120	100	220	280
	Sum	350	410	390	800	1150
	Mean	87.5	102.5	97.5		287.5
Gem						
Lone Pine	5	140	170	310	480	620
Sandrock Draw	6	90	60	80	140	230
Rimrock	7	210	380	485	865	1075
Babbitt Lake	8	180	265	270	535	715
Limestone Canyon	9	90	190	250	440	530
Hell Canyon	10	185	930	270	1200	1385
	Sum	895	1995	1665	3660	4555
	Mean	149.17	332.5	277.5		759.17
Springerville						
Indian Mountain	11	40	100	185	285	325
Buckhead Mesa	12	100	30	70	100	200
Black Canyon	13	60	100	120	220	280
Witty Tom	14	40	180	280	460	500
AA	15	305	240	215	455	760
Carrizo	16	60	65	210	275	335
Yampai	17	130	115	180	295	425
	Sum	735	830	1260	2090	2825
	Mean	105.0	118.57	180.0		403.57
Grand sum		1980	3235	3315	6550	8530
Grand mean						83.62

Table 31.--Bouteloua curtipendula - Analysis of variance

Source of variation	Degrees of freedom	Sums of squares	Mean square	F
Total	100	973808		
Soils	16	288641		
Series	(2)	108110	54055.0	4119*
Samples	(14)	180531	12895.1	1.02
Fertilizers	2	32976		
Nitrogen	(1)	32882	32882.0	4.82*
Phosphorus	(1)	94	94.0	1
Replications	1	5368	536.8	1
Soils x reps	16	203132	12695.7	
Ser x reps	(2)	14179	7089.5	1
Sam x reps	(14)	188953	13496.6	1.98*
Pooled error	65	443691	6826.0	

* Indicates significance at .05 level

Table 32.

BABBITT LAKE - Basalt

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr (Bouteloua gracilis)	2.60	92	261
Sihy (Sitanion hystrix)		0.2	24
CARE (Carex spp.)	.04	.2	3
ARIS (Aristida spp.)		1	6
Hija (Hilaria jamesii)	.04	2	19
Ormi (Oryzopsis micrantha)	.04		
Gusa (Gutierrezia sarothrae)	.08		0.3
Hyri (Hymenoxys richardsoni)	.04	--	3
Hyco (Hymenoxys cooperi)			.2
Cholla (Opuntia spp.) (cholla)	.04	3	
Vian (Viguiera annua)			4
Depi (Descurainia pinnata)			43
Anwe (Annual weed)			.2
Lowr (Lotus wrightii)			2
Ampo (Amaranthus powellii)			2
ASTR (Astragalus spp.)			5
ERIG (Erigeron spp.)			1
Hylu (Hymenopappus lugens)			.2
Moss (moss)	.04		
Grass			313
Forbs			57
Half shrubs			3
Total		98	373

Table 33.

BABBITT LAKE - Tortugas

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr (Bouteloua gracilis)	1.80	70	234
Sihy (Sitanion hystrix)		0.4	26
CARE (Carex spp.)			
ARIS (Aristida spp.)			
Hija (Hilaria jamesii)			
TRID (Tridens spp.)			
Angr (Annual grass)			1
Sesp (Senecio spartioides)			1
Epvi (ephedra viridis)	.08	1	3
Gusa (Gutierrezia sarothrae)	.08	1-	15
Hyri (Hymenoxys richardsoni)	.28		2
Hyco (Hymenoxys cooperi)			
Cholla (Opuntia spp.) (cholla)	.04		
apa (Fallugia paradoxa)	0.04	.4	3
Chmi (Chamaebatiaria millefolium)		11	
Vian (Viguiera annua)			1
Depi (Descurainia pinnata)			27
Anwe (Annual weed)	.04	10	5
Lowr (Lotus wrightii)			
Ampo (Amaranthus powellii)			5
ASTR (Astragalus spp.)			2
ERIG (Erigeron spp.)			0.2
Hylu (Hymenopappus lugens)			
Hyac (Hymenoxys acaulis)		5	3
EUPH (Euphorbia spp.)			1
SPHA (Sphaeralcea spp.)			.3
Gimu (Gilia multiflora)			1
Moss (moss)	.68		
Grass			261
Forbs			47
Half shrubs			22
Total		90	330

Table 34.
AA - Basalt

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr (Bouteloua gracilis)	.88	28	153
Pofe (Poa fendleriana)	.04	2	73
Sihy (Sitanion hystrix)		4	60
Trpu (Tridens pulchellus)		-	1
Angr (Annual grass)		1	-
Bocu (Bouteloua curtipendula)	.08	1	-
ARIS (Aristida spp.)		0.1	-
Gusa (Gutierrezia sarothrae)	.12	3	215
Peli (Penstemon linarioides)		5	42
HYME (Hymenoxys spp.)	.04	2	285
Come (Cowania mexicana)		-	4
ERIO-cog (Eriogonum cognatum)	.24	25	23
Vian (Viguiera annua)		-	44
ERIG (Erigeron spp.)		-	29
EUPH (Euphorbia spp.)		-	5
Erco (Erigeron concinnus)		0.4	3
Anwe (Annual weed)		1	1
Deco (Desmanthus cooleyi)		0.4	6
Pevi (Penstemon virgatus)		0.4	0.3
LACT (Lactuca spp.)		-	1
AREN (Arenaria spp.)		0.1	
Perennial Grass			287
Annual Grass			0
Forbs			112
Half Shrubs			546
Total		74	945

Table 35.
AA - Showlow

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr(Bouteloua gracilis)	4.48	84	280
Pofe(Poa fendleriana)		1	31
Sihy(Sitanion hystrix)		1	15
Spcr(Sporobolus cryptandrus)		1	1
Ormi(Oryzopsis micrantha)		-	4
ARIS(Aristida spp.)	.04	1	5
Gusa(Gutierrezia sarothrae)	.16	0.4	11
Peli(Penstemon linarioides)		1	16
HYME(Hymenoxys spp.)		1	35
Rhtr(Rhus trilobata)			1
PP (Prickly pear)	.16		
ERIO-cog(Eriogonum cognatum)	.20	21	6
EUPH(Euphorbia spp.)			2
Erco(Erigeron concinnus)			0.6
Erra(Eriogonum racemosum)			0.2
Pevi(Penstemon virgatus)			3
AREN(Arenaria spp.)			1
PSOR(Psoralea spp.)			5
Anwe (Annual weed)		1	3
Moss (moss)	.20		

Table 36.

BLACK CANYON - Basalt

	Basal area 1961	Production (Pounds per acre) 1963	1965
Spcr (Sporobolus cryptandrus)		2	35
Angr (Annual grass)		21	7
Sihy (Sitanion hystrix)		4	103
Bocu (Bouteloua curtipendula)		2	15
Ormi (Oryzopsis micrantha)	.04	7	
Bogr (Bouteloua gracilis)		0.2	
Polo (Poa longiligula)			
Boer (Bouteloua eriopoda)			
Orhy (Oryzopsis hymenoides)			66
ARIS (Aristida)		0.4	
Brru (Bromus rubens)			5
ERAG (Eragrostis)			0.3
Gusa (Gutierrezia sarothrae)	11.40	130	9
Yuba (Yucca baccata)	1.08	7	
PP (Prickly pear)	.40	126	
Agut (Agave utahensis)			
Epvi (Ephedra viridis)	.04	2	
Come (Cowania mexicana)		4	
Ersi-Erwr (Eriogonum wrightii)		5	
Mesc (Menodora scabra)			0.1
Arfo (Annual weeds)	.04	65	1
ERIO (Eriogonum spp.)		0.2	2
CIRS (Cirsium)		0.2	
Mimu (Mirabilis multiflora)		18	
POLY (Polygala)		1	
PSOR (Psoralea)			0.1
EUPH (Euphorbia)			1
MIRA (Mirabilis spp.)			2
BOUT (Bouteloua) (annual)			1
Lowr (Lotus wrightii)			0.1
Ampo (Amaranthus powellii)			0.1
Grass			232
Forbs			6
Half shrubs			9
Total		397	24 7

Table 37.

BLACK CANYON - Babble

	Basal area 1961	Production (Pounds per acre) 1963	1965
Spcr (Sporobolus cryptandrus)		0.1	19
Sihy (Sitanion hystrix)	.04	2	10
Bocu (Bouteloua curtipendula)		20	94
Ormi (Oryzopsis micrantha)		2	
Bogr (Bouteloua gracilis)	3.36	2	4
Polo (Poa longiligula)		6	32
Boer (Bouteloua eriopoda)		24	87
Brru (Bromus rubens)			5
Stsp (Stipa speciosa)			2
Orhy (Oryzopsis hymenoides)			7
Angr (Annual grass)		1	
Stco (Stipa comata)			3
Gusa (Gutierrezia sarothrae)	3.28	81	11
Yuba (Yucca baccata)		10	
PP (Prickly pear)		1152	
Agut (Agave utahensis)		961	
Epvi (Ephedra viridis)		3	
Come (Cowania mexicana)	.04	2	
Arfe (Aristida fendleriana	.04		
Spin (Sporobolus interruptus)			
Anwe (Annual weed)		15.87	
Phlox (Phlox)		0.1	
ASTR (Astragalus)		0.4	1
Vimu (Viguiera multiflora)		1	
Mimu (Mirabilis multiflora)		1	
Crfl (Cryptantha flava)		0.1	
Vian (Viguiera annua)			0.3
MIRA (Mirabilis)			1
Grass			263
Forbs			2
Half shrubs			11
Total		2283	276

Table 38.

YAMPAI - Springerville

	Basal area 1961	Production (Pounds per acre) 1963	1965
Himu(Hilaria mutica)	0.76	133	183
Angr(Annual grass)		34	0.1
Bogr(Bouteloua gracilis)	.36	19	175
Sihy(Sitanion hystrix)		0.480	68
Bocu(Bouteloua curtipendula)	.12	5	67
Polo(Poa longiligula)		1	
ARIS(Aristida spp.)	.04	1	9
Spcr(Sporobolus cryptandrus)		5	16
Orhy(Oryzopsis spp.)	.12		10
Paob(Panicum obtusum)			10
Gusa(Gutierrezia sarothrae)	1.12	2	2
Cholla(Opuntia spp.)(prickly pear)	.04	2	
Mesc(Menodora scabra)	.08		1
Anwe(Annual weed)		163	
PSOR (Psoralea spp.)		0.4	
MIRA(Mirabilis spp.)			0.6
EUPH(Euphorbia spp.)			4
Saka(Salsola kali)			6
Grass			538
Forbs			11
Half shrubs			3
Total	2.64	367	552

Table 39.

YAMPAI - Dye

	Basal area 1961	Production (Pounds per acre) 1963	1965
Angr (Annual grass)		23	
Bogr(Bouteloua gracilis)	1.16	29	178
Spcr(Sporobolus cryptandrus)		0.05	28
Sihy(Sitanion hystrix)		2	47
Boer(Bouteloua eriopoda)	.16	6	23
Himu(Hilaria mutica)		.2	
Orhy(Oryzopsis spp.)	.04	11	127
ARIS(Aristida spp)	.16		3
Muto(Muhlenbergia torreyi)			6
LYCI(Lycium spp)	.12		
Gusa(Gutierrezia sarothrae)	4.88	15	37
Eula(Eurotia lanata)		1	
Mesc(Menodora scabra)			3
OPUNpp(Opuntia spp.) (prickly pear)	.04		
Anwe(Annual weed)		121	
SPHA(Sphaeralcea spp).	.08		0.6
Lego(Lesquerella gordoni)			.4
Saka(Salsola kali)			4
EUPH(Euphorbia spp)			.9
Astrag.(Astragalus spp.)			.2
MIRA(Mirabilis spp.)			.2
Grass			412
Forbs			6
Half shrubs			40
Total	6.64	209	458

Table 40.

INDIAN MOUNTAIN - Basalt

	Basal area 1961 m	Production(Pounds per acre) 1963	1965
Angr(Annual grass)		9	103
Bocu(Bouteloua curtipendula)	0.12	3	129
Himu(Hilaria mutica)		10	31
Spcr(Sporobolus cryptandrus)		0.3	
CARE(Carex spp.)		.04	
ARIS(Aristida spp.)			
Bogr(Bouteloua gracilis)			6
Sema(Setaria macrocarpa)			1
Spin(Sporobolus interruptus)			1
Lyph(Lycurus phleoides)			2
ERAG(Eragrostis spp.)			69
Sihy(Sitanion hystrix)			2
Gusa(Gutierrezia sarothrae)			
Cholla(Opuntia spp.)	.08	.8	
PP(Opuntia spp.) (prickly pear)	.36	333	
Mesc(Menodora scabra)	.08		
Anfo(Annual weed)		13	4
Mimu(Mirabilis multiflora)		2	3
Poav(Polygala spp.)		.1	
EUPH(Euphorbia spp.)			35
Erco(Eriogonum cognatum)			8
ERIO(Eriogonum spp.)			7
Ampo(Amaranthus powellii)			1
Perennial grass			196
Annual grass			172
Forbs			58
Total		370	426

Table 41.

INDIAN MOUNTAIN - Granite

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr(Bouteloua gracilis)	2.84	67	1,135
Angr(Annual grass)		6	60
Paob(Panicum obtusum)		7	255
Muwr(Muhlenbergia wrightii)		1	37
Bocu(Bouteloua curtipendula)	.04	1	28
Spcr(Sporobolus		3	11
Muto(Muhlenbergia torreyi)		0.3	
ARIS(Aristida spp.)		1	38
Lyph(Lycurus phleoides)		.2	27
SCIR(Scirpus spp.)			6
ERAG(Eragrostis spp.)			1
Cholla(Opuntia spp.) (cholla)	.28	1	
PP(Opuntia spp.) (prickly pear)	.20		
LYCI(Lycium spp.)	.20		
Gusa(Gutierrezia sarothrae)	.04		
Anfo(Annual weed)		97	18
POLY(Polygala spp.)		.1	
Hean(Helianthus annuus)			3
SPHA(Sphaeralcea spp.)			18
Lowr(Lotus wrightii)			4
EUPH(Euphorbia spp.)			10
Asar(Aster arenosus)			12
MIRA(Mirabilis spp.)			3
Unwe(Perennial weed)			5
ERIO(Eriogonum spp.)			11
Ampo(Amaranthus powellii)			0.3
Perennial grass			1,537
Annual grass			61
Forbs			84
Total		182	1,682

Table 42.

HELL CANYON - Basalt

	Basal area 1961	Production (Pounds per acre) 1963	1965
Himu(Hilaria mutica)	2.60	171	332
Paob(Panicum obtusum)		4	
Angr(Annual grass)	.96	0.2	
Bocu(Bouteloua curtipendula)	.04	.08	51
Sihy(Sitanion hystrix)		1	4
Bogr(Bouteloua gracilis)		.08	15
MIMO(Mimosa spp.)		8	
Eula(Eurotia lanata)		3	
OPUN(Opuntia spp.)	.44	9	
Erwr(Eriogonum wrightii)			23
Unwe(Annual weeds)	.04	.1	3
MIRA(Mirabilis spp.)		.2	
Arlu(Artemisia ludoviciana)		.1	
Vian(Viguiera annua)			172
Saka(Salsola kali)			8
Veth(Verbascum thapsus)			0.1
SPHA(Sphaeralcea spp.)			8
ASTER(Aster spp.)			3
EUPH(Euphorbia spp.)	.56		3
Erfa(Erigeron	1.12		
Grass			402
Forbs			197
Half shrubs			23
Total		196	622

Table 43.

HELL CANYON - Babble

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bocu(Bouteloua curtipendula)	0.88	10	201
Bogr(Bouteloua gracilis)	.28	8	33
Sihy(Sitanion hystrix)	.08	1	15
TRID(Tridens spp.)	.36	1	46
Himu(Hilaria mutica)	.52	26	37
Boer(Bouteloua eriopoda)	.04	4	88
Angr(Annual grass)		1	4
Spcr(Sporobolus cryptandrus)			10
ARIS(Aristida spp.)			2
Ungr(Unknown grass)	.08		6
Kocr(Koeleria cristata)			9
MIMO(Mimosa spp.)	1.96	39	
Gusa(Gutierrezia sarothrae)	3.36	12	8
PP(Opuntia spp.) (prickly pear)	2.32	545	
AGAVE(Agave spp.)		1,600	
(Unknown halfshrub)	.12		
Arlu(Artemisia ludoviciana)		0.4	2
ERIG(Erigeron spp.)		.08	
PLANT POA			0.2
SPHA(Sphaeralcea spp.)			.1
Anwe(Annual weed)	.08		
Grass			451
Forbs			2
Halfshrubs			8
Total		2,247	461

Table 44.

WITTY TOM - Springerville

	Basal area 1961	Production (Pounds per acre) 1963	1965
Himu(Hilaria mutica)	0.32	19	96
Bocu(Bouteloua curtipendula)	.36	10	317
Angr(Annual grass)		36	
Sihy(Sitanion hystrix)			1
ARIS(Aristida spp.)			7
Muto(Muhlenbergia torreyi)			6
Lyph(Lycurus			3
Cholla(Opuntia spp.) (cholla)	.88	1	
P.P(Opuntia spp.) (prickly pear)	.24	1	
ECHI(Echinocereus spp.)		1	
Gusa(Gutierrezia sarothrae)			2
Anwe(Annual weed)		17	18
Deco(Desmanthus cooleyi)		2	50
EUPH(Euphorbia spp.)			45
Vimu(Viguiera multiflora)			194
EUPH(Euphorbia spp.)			13
Hean(Helianthus annuus)			47
SPHA(Sphaeralcea spp.)			2
Saka(Salsola kali)			2
LACT(Lactuca spp.)			2
Hylu(Hymenopappus lugens)			6
Grass			430
Forbs			379
Half shrubs			2
Total	1.00	86	811

Table 45.

WITTY TOM - Cross

	Basal area 1961	Production (Pounds per acre) 1963	1965
Boer(Bouteloua eriopoda)	0.60	7	39
Bogr(Bouteloua gracilis)	1.28	7	104
Angr(Annual grass)		64	
Himu(Hilaria mutica)	.84	91	370
Bocu(Bouteloua curtipendula)		4	46
Muto(Muhlenbergia torreyi)	.10	1	2
ARIS(Aristida spp)			2
Spin(Sporobolus interruptus)			
Spcr(Sporobolus contractus)			49
Spco(Sporobolus contractus)			1
Mesc(Menodora scabra)	.08		9
Gusa(Gutierrezia sarothrae)	2.92	6	9
Cholla(Opuntia spp.)	.44	3	
ECHI(Echinocereus spp.)		0.450	
Anfo(Annual weed)		71	2
Deco(Desmanthus cooleyi)		.1	
SPHA(Sphaeralcea spp.)		1	
Astrag(Astragalus spp.)	.04		0.3
Asar(Aster arenosus)			22
Saka(Salsola kali)	.04		116
Ampo(Amaranthus powellii)			30
EUPH(Euphorbia spp.)			1
POLY(Polygala spp.)			2
Pewe(Perennial weed)			2
Grass			613
Forbs			176
Half shrubs			18
Total	6.36	254	807

Table 46.

RIM ROCK - Gem

	Basal area 1961	Production (Pounds per acre) 1963	1965
Himu(*Hilaria mutica*)	0.68	144	25
Angr(Annual grass)		151	10
Hibe(*Hilaria belangeri*)	.08	7	69
Bocu(*Bouteloua curtipendula*)		0.4	7
Spcr(*Sporobolus cryptandrus*)			5
TRID(*Tridens* spp.)			7
Ungr(Perennial grass)			
Gusa(*Gutierrezia sarothrae*)	7.12	182	37
Ersio(*Eriogonum* (shrubby)	.04	4	3
PP(*Opuntia* spp.) (prickly pear)	3.84	2,592	
Unsh(Unknown shrub)		2	
holla(*Opuntia* spp) (Cholla)	.16	.4	
Yuba(*Yucca baccata*)	.48	72	
Cowr(*Cordylanthus wrightii*)	.52		
Anfo(Annual weed)		83	
EUPH(Euphorbia spp)			4
Vimu(*Vigueria multiflora*)			0.2
ERIO(*Eriogonum*) (forbs)			.6
Grass			123
Forbs			5
Half shrubs			40
Total	12.92	3,238	168

Table 47.

RIM ROCK - Retriever

	Basal area 1961	Production (Pounds per acre) 1963	1965
TRID (Tridens spp)		0.3	5
Bocu (Bouteloua curtipendula)		0.1	7
Angr (Annual grass)		.1	
ARIS (Aristida spp.)		3	5
Spco (Sporobolus contractus)			6
Ungr (Unknown grass)			5
Spcr (Sporobolus cryptandrus)			1
Acacia (Acacia spp.)	0.28		
Gusa (Gutierrezia sarothrae)	8.24	151	29
Unknown halfshrub		83	
Unknown halfshrub		48	
Erwr (Eriogonum (shrubby)			3
ERIO (Eriogonum spp.)		3	
EUPH (Euphorbia spp.)	.04	2	8
Anwe (Annual weed)		.3	1
ASTR (Astragalus spp.)		1	13
Deco (Desmanthus cooleyi)		.2	
PENS (Penstemon spp.)			0.2
Vimu (Vigueria multiflora)			3
Nomi (Nolina microcarpa)			2
MIRA (Mirabilis spp.)			0.1
SPHA (Sphaeralcea spp.)			2
Cowr (Cordylanthus wrightii)	.92		
CHEN (Chenopodium spp.)			.4
Grass			29
Forbs			29
Half shrubs			32
Total	10.24	292	90

Table 48.

SAND ROCK DRAW - Gem

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bohi(Bouteloua hirsuta)	Missed	32	419
Bogr(Bouteloua gracilis)	7.40	61	418
Arfe(Aristida fendleriana)	1.24	8	45
Bocu(Bouteloua curtipendula)	0.12	2	15
Ungr(Unknown grass)		6	28
Sihy(Sitantion hystrix)		6	114
CARE(Carex spp.)		0.2	
AGRO(Agropyron spp)		.4	
Spin(Sporobolus interruptus)			1
Kocr(Koerleria cristata)			13
Muwr(Muhlenbergia wrightii)	.08		10
SCIR(Scirpus spp.)			3
Muto(Muhlenbergia torreyi)			1
Gusa(Gutierrezia sarothrae)	16.92	249	
Hyco(Hymenoxys cooperi)		2	
OPP(Opuntia spp)	.04		
Lare(Lappula Redowskii)	.04		
Ampo(Amaranthus powellii)		1	
Poav(Polygonum aviculare)		1	
Erra(Eriogonum racemosum)		1	1
Erfo(Erigeron formosissimus)		1	
Erfl(Erigeron flagellaris)		1	
ARTE(Artemesia spp)		.2	
Deco(Desmanthus cooleyi)	.04	2	1
PINK(Pink family)		.3	
Unwe(Perennial weed)		.4	
Erco(Eriogonum cognatum)		4	

Table 48 Cont'd.

SAND ROCK DRAW - Gem

	Basal area 1961	Production (Pounds per acre) 1963	1965
EUPH(*Euphorbia* spp)			2
Veth(*Verbascum thapsus*)			0.4
Feoc(*Festuca octoflora*)	0.12		
Grass			1,067
Forbs			4
Half shrubs			
Total	26.00	378	1,071

Table 49.

SAND ROCK DRAW - Hogg

	Basal area 1961	Production (Pounds per acre)	
		1963	1965
Bogr(Bouteloua gracilis)	3.36	52	176
Bohi(Bouteloua hirsuta)		34	643
CARX(Carex spp.)		0.02	
Pofe(Poa fendleriana)		.4	37
Sihy(Sitanion hystrix)	0.04	1	76
Spin(Sporobolus interruptus)	.04		4
Angr(Annual grass)			26
Muto(Muhlenbergia torreyi)			2
SCIR(Scirpus spp.)			2
Arfe(Aristida fendleriana)	.04		
Hyco(Hymenoxys cooperi)		3	2
Gusa(Gutierrezia sarothrae)	3.28	123	
Hyru(Hymenoxys rusbyi)		.3	
Poav(Polygonum aviculare)		.3	
Erfl(Erigeron flagellaris)		5	
Ampo(Amaranthus powellii)		.1	
Asar(Aster arenosus)		3	
Erra(Eriogonum racemosum)		1	
Deco(Desmanthus cooleyi)		1	
TARA(Taraxacum spp.)		2	
Sene(Senecio neomexicanus)		.1	
ASCL(Asclepias spp.)		.3	
Erfo(Erigeron formosissimus)		2	
PENS(Penstemon spp.)		1	
Veth(Verbascum thapsus)			36
EUPH(Euphorbia spp.)			10
Grass			966
Forbs			46
Halfshrubs			2
Total		228	1,014

Table 50.

BUCKHEAD - Springerville

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bohi(Bouteloua hirsuta)	0.04	13	84
Sihy(Sitanion hystrix)		0.3	29
Bocu(Bouteloua curtipendula)	.36	3	109
Bogr(Bouteloua gracilis)	.56	1	1
Paob(Panicum obtusum)		3	39
Arfe(Aristida fendleriana)		1	--
ERAG(Eragrostis spp)		1	
Angr(Annual grass)			13
Spcr(Sporobolus cryptandrus)			21
ARIS(Aristida spp.)	.04		5
Gusa(Gutierrezia sarothrae)	4.08	80	83
Peli(Penstemon linarioides)		15	14
Erwr(Eriogonum (shrubby)	.96	14	9
SENE(Senecio spp.)		0.1	
MIMO(Mimosa spp.)		1	
Agave(Agave)	.24		
Mesc(Menodora scabra)	.04		
Anwe(Annual weed)		14	15
ERIO(Eriogonum spp)		2	
Ercog(" cognatum)		1	1
EUPH(Euphorbia spp)			90
Gimu(Gilia multiflora)			13
Unknown forb	.20		
Grass			301
Forbs			119
Half shrubs			106
Total	6.52	148	

Table 51.

BUCKHEAD - Buckhead

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bout(Bouteloua) (annual)	0.04		
Bohi(Bouteloua hirsuta)	.28	6	3
Bocu(Bouteloua curtipendula		0.48	17
Bogr(Bouteloua gracilis)	.20	2	--
Arfe(Aristida fendleriana)	.12	1	
Polo(Poa longiligula)		.46	
Muem(Muhlenbergia emersleyi)	.16	2	33
Sihy(Sitanion hystrix)		0.05	
Ungr(Unknown grass)		5	10
CAREX(Carex spp.)			4
Spin(Sporobolus interruptus)			7
ARIS(Aristida spp.)			2
Gusa(Gutierrezia sarothrae)	.12	0.2	
Peli(Penstemon linarioides)	.32	10	6
MIMO(Mimosa spp.)	1.56	92	
Erwr(Eriogonum (shrubby)			0.6
Mesc(Menodora scabra)	.04		
ERIO(Eriogonum (forb)		1	
Holu(Hymenopappus lugens)		0.4	
Soli(Solidago missouriensis)		1	
SENE(Senecio spp.)		0.1	
Erto(Erigeron formosissimum)		1	
Unknown forb	.08		
Moss(Moss)	.40		
Ercog(Eriogonum cognatum)	.04		
Grass			76
rbs			0
Half shrubs			6
Total	3.36	121	82 (21 are 1 acre)

Table 52.

CARRIZO - Basalt

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bocu (Bouteloua curtipendula)	.12	2	4
Sihy (Sitanion hystrix)		1	49
Bohi (Boutelua hirsuta)		0.1	
Bogr (Bouteloua gracilis)	.04	1	11
Angr (Annual grass)			41
Pofe (Poa fendleriana)			5
Spcr (Sporobolus cryptandrus)			-
Agin (Agropyron intermedium)			2
Gusa (Gutierrezia sarothrae)	.32	2	11
Mesc (Menodora scabra)		7	2
Peli (Penstemon linarioides)	.12	192	25
Ersi-Erwr (Eriogonum wrightii)		1	
PP (Prickly pear)		5	
ERIO (Eriogonum spp.)		0.2	1
PSOR (Psoralea spp.)		0.2	7
Deco (Desmanthus cooleyi)		1	0.1
Erco (Eriogonum cognatum)			0.3
Anwe (Annual weed)			9
EUPH (Euphorbia spp.)			10
SPHA (Sphaeralcea spp.)			5
LACT (Lactuca spp.)			2
TRAG (Tragopogon spp.)			0.3
Hean (Helianthus annus)			0.3
Vian (Viguiera annua)			1
Perennial Grass			71
Annual Grass			41
Forbs			35
Half Shrubs			38
Total		213	185

Table 53.

CARRIZO - Corduroy

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr (Bouteloua gracilis)	.56	11	108
Sihy (Sitanion hystrix)		1	21
Pofe (Poa fendleriana)	.04	2	31
CARE (Carex spp.)		0.3	4
Bocu (Bouteloua curtipendula)	.16	14	58
Angr (Annual grass)			9
Gusa (Gutierrezia sarothrae)	.40	21	7
Peli (Penstemon linarioides)		15	2
Mesc (Menodora scabra)			
PP (Prickly pear)	.32	40	
Cholla (Opuntia spp.) (cholla)		0.4	
Ersi-Erwr (Eriogonum wrightii)	.04	0.2	
Half shrub (Unknown)	.04		
BACC (Baccharis spp.)	.32		
ERIO (Eriogonum spp,)		10	1
Anwe (Annual weed)	.04	1	28
CHEN (Chenopodium spp.)		7	
Deco (Desmanthus cooleyi)		004	
Peba (Penstemon barbatus)		1	
Nomi (Nolina mexicann)		2	
POLY (Polygala spp.)		0.3	
Asar (Aster arenosus)			1
Pepa (Pectis papposa)			-
EUPH (Euphorbia spp.)	.20		2
Moss (moss)			
Perennial Grass			222
Annual Grass			9
Forbs			31
Half Shrubs			9
Total		126	271

Table 54.

LONE PINE - Gem

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr(Bouteloua gracilis)	4.60	51	205
Bocu (Bouteloua curtipendula)		35	144
Bohi (Bouteloua hirsuta)	missed	17	18
Sihy (Sitanion hystrix)	.04	1	5
Hija (Hilaria jamesii)	.12	5	39
Lyph (Lycurus phleoides)		1	5
ARIS (Aristida spp.)		2	7
Muto(Muhlenbergia torreyi)	.04	0.07	1
Ungr (Unknown grass)			2
Spcr(Sporobolus cryptandrus)			1
Gusa(Gutierrezia sarothrae)	.24	9	4
Ersi(Eriogonum (shrubby)			8
OPUN(Opuntia spp.)	.08		
PSOR(Psoralea spp.)		2	
PHAC(Phacelia spp.)		6	
Deco(Desmanthus cooleyi)		0.1	
Asar(Aster arenosus)		.3	
SPHA(Sphaeralcea spp.)		1	
Hean(Helianthus annuus)		1	
ERIO(Eriogonum (forb))		4	
Anwe(Annual weed)		1	
Unwe(Perennial weed)		6	
Saka(Salsola kali)		1	
CIRC(Cirsium spp.)		3	
Moss (Moss)	.04		
Grass			427
Forbs			17
Half shrubs			4
Total	5.16	137	448

Table 55.

LONE PINE - Snowflake

	Basal area 1961	Production (Pounds per acre) 1963	1965
Bogr(Bouteloua gracilis)	5.72	31	115
Boer(Bouteloua eriopoda)	.24	6	8
Lyph(Lycurus phleoides)		5	48
Muto(Muhlenbergia torreyi)	2.00	7	119
Bohi(Bouteloua hirsuta)	missed	19	64
Hija(Hilaria jamesii)		5	4
Spcr(Sporobolus cryptandrus)		3	12
ARIS(Aristida spp.)	.04	0.4	7
Sihy(Sitanion hystrix)		.4	10
POA(Poa spp.)	.08		
STIP(Stipa spp.)	.04		
Ersi(Eriogonum shrubby)		2	
Isa(Gutierrezia sarothrae)	.20	9	12
CHRY(Chrysothamnus spp.)	.04	1	1
Cholla(Opuntia spp.)	.12	0.2	
Peli(Penstemon linarioides)			0.456
Yugl(Yucca glauca)	.04		
ARTE(Artemisia spp.)	.04	0.1	
Anwe(Annual weed)		23	
ERIO(Eriogonum)		1	8
PSOR(Psoralea spp.)		4	
Deco(Desmanthus cooleyi)	.08	1	
Asar(Aster arenosus)			3
Pepa(Pectis papposu)			9
POLY(Polygala spp.)			8
Unwe(Perennial weed)			.1
SPHA(Sphaeralcea spp.)			7
Moss(Moss)	.32		
Total	9.48	116	435

Table 56.--Precipitation at Babbitt Lake plot

Date	Precipitation since last date
	Inches
December 12, 1962	--
June 4, 1963	3.83
August 26, 1963	3.43
October 2, 1963	2.61
June 17, 1964	5.33
September 28, 1964	6.63
May 14, 1965	6.43
September 9, 1965	5.12
April 12, 1966	3.09
September 20, 1966	5.84
April 20, 1967	4.33

Table 57.--Precipitation at Double A plot

Date	Precipitation since last date
	Inches
December 14, 1962	--
June 5, 1963	16.38
September 12, 1963	11.38
October 1, 1963	1.55
June 1, 1964	8.15
September 29, 1964	8.66
May 21, 1965	13.92
September 9, 1965	5.71
April 14, 1966	12.55
September 20, 1966	4.69
May 2, 1967	9.76

Table 58.--Precipitation at Black Canyon plot

Date	Precipitation since last date
	Inches
December 14, 1962	[illegible]
June 5, 1963	6.41
September 10, 1963	4.40
October 4, 1963	6.39
June 1, 1964	8.32
September 30, 1964	3.95
May 18, 1965	11.27
October 1, 1965	5.40
April 22, 1966	12.12
September 22, 1966	4.10
March 22, 1967	8.42

Table 59.--Precipitation at Yampai plot

Date	Precipitation since last date
	Inches
December 14, 1962	--
June 5, 1963	5.12
September 9, 1963	5.77
October 4, 1963	6.84
June 1, 1964	6.67
September 30, 1964	8.56
May 12, 1965	8.66
September 29, 1965	6.05
April 21, 1966	9.90
September 22, 1966	4.39
March 23, 1967	6.53

Table 60.--Precipitation at Indian Mountain plot

Date	Precipitation since last date
	Inches
December 14, 1962	[illegible]
June 6, 1963	4.61
September 11, 1963	4.09
October 4, 1963	6.15
June 1, 1964	6.57
October 12, 1964	11.96
May 12, 1965	11.69
September 29, 1965	8.35
April 11, 1966	13.32
October 4, 1966	5.84
June 20, 1967	6.15

Table 61.--Precipitation at Hell Canyon plot

Date	Precipitation since last date
	Inches
December 14, 1962	--
June 6, 1963	4.59
August 28, 1963	3.20
October 4, 1963	9.40
June 1, 1964	4.88
September 29, 1964	7.73
April 30, 1965	9.45
September 24, 1965	5.19
April 0, 1966	9.69
September 20, 1966	3.77
June 20, 1967	5.33

Table 62.--Precipitation at Witty Tom plot

Date	Precipitation since last date
	Inches
June 6, 1963	--
September 3, 1963	6.81
October 4, 1963	3.19
April 28, 1964	6.26
September 29, 1964	2.89
May 3, 1965	12.37
September 7, 1965	4.98
April 7, 1966	10.66
September 20, 1966	3.20
June 20, 1967	8.88

Table 63.--Precipitation at Rim Rock (Walker) plot

Date	Precipitation since last date
	Inches
September 4, 1963	--
October 3, 1963	0.82
June 12, 1964	7.46
October 1, 1964	5.95
April 30, 1965	11.69
September 1, 1965	6.84
September 23, 1965	2.17
April 6, 1966	10.38
September 20, 1966	5.40
March 28, 1967	3.47

Table 64.--Precipitation at Sand Rock Draw plot

Date	Precipitation since last date
	(Inches)
July 26, 1963	--
August 30, 1963	8.94
October 8, 1963	0.96
May 12, 1964	11.55
October 5, 1964	9.87
May 17, 1965	overflow
September 23, 1965	10.07
April 18, 1966	13.10 or more (overflow)
September 30, 1966	4.71
March 28, 1967	7.75

Table 65.--Precipitation at Buckhead Mesa plot

Date	Precipitation since last date
	(Inches)
December 6, 1962	--
June 12, 1963	8.39
August 29, 1963	12.99
October 8, 1963	2.03
May 15, 1964	11.86
October 5, 1964	10.28
May 17, 1965	overflow
September 22, 1965	6.53
April 23, 1966	10.04
September 30, 1966	11.16
March 28, 1967	11.45

Table 66.--Precipitation at Carrizo plot

Date	Precipitation since last date
	Inches
September 21, 1962	--
May 17, 1963	9.39
June 7, 1963	3.54
September 5, 1963	8.73
October 8, 1963	2.82
May 22, 1964	6.74
October 15, 1964	10.55
May 20, 1965	12.82
September 3, 1965	4.81
April 15, 1966	6.68
September 29, 1966	7.99
March 27, 1967	5.11

Table 67.--Precipitation at Lone Pine plot

Date	Precipitation since last date
	Inches
June 7, 1963	--
September 4, 1963	5.38
October 8, 1963	2.75
May 18, 1964	5.02
October 16, 1964	6.94
May 20, 1965	7.22
September 2, 1965	5.43
April 14, 1966	8.65
September 29, 1966	6.63
March 27, 1967	3.35

TREATMENTS

Pretreatment measurements were taken in September 1963. Initial juniper control and fencing on all plots was accomplished between September 1963 and June 1965, except the Lone Pine plots which were fenced in the spring of 1967. Juniper trees were killed by sawing or girdling. In addition, stumps of Juniperus deppeana were sprayed with polychloro benzoic acid in diesel oil to prevent sprouting (see Jameson and Johnsen, Weeds 12:140).

Herbaceous plants and half shrubs on all plots were treated in the spring of 1965 with 2,4-D butoxy ethanol ester (see Johnsen, Weeds 10:328). Quercus turbinella was treated with fenuron in 25 percent pellets. Other shrubs were treated with polychloro benzoic acid.

Follow up treatments were made in the spring of 1966 and 1967. Cutting and girdling treatments completed the kill on trees. The following report of treatments in 1966 and 1967 was prepared by William H. Kruse, Range Research Technician.

"The juniper plots were treated in the spring of 1966 and 1967. The treatment material was 2,4-D and Tordon 22K. The 2,4-D LV-4 (butoxy ethanol ester) with an acid equivalent of 4 pounds per gallon was mixed with water to form a solution concentration of approximately 13.5 pounds per 100 gallons. A "Tordon" application was the 2,4-D mix with the addition of Tordon 22K (potassium salt picloram). The amount of Tordon was 3.4 pounds per 100 gallons. The 2,4-D was applied to snakeweed (Gutierrezia spp.) and other forbs. The tordon mix was applied to woody plants, Juniperus spp., Pinus spp., Quercus spp., and Cactus (Opuntia spp.). Treatment was set for the time Gutierrezia was 4 inches high.

"The following observations were taken in spring 1967.

"Babbitt Lake Plot: Treated March 21, 1967 and April 12, 1966.

"Plot A.--Fairly messy with respect to snakeweed. Many juniper and pinyon seedlings sprouting on the plot. These were treated with the tordon mix. The ground was dry with only 3.71 inches precipitation at the time of spray. Although comparable to the previous year, the moisture was early.

"Plot B.--Some large plants of snakeweed. In 1967, the plots were probably sprayed a little late with respect to snakeweed). Additional moisture since this time.

"Black Canyon Plot: Treated March 22, 1967 and April 22, 1966.

"Plot A.--The plot was clean of snakeweed. Treatment was applied to sprouts or seedlings of century plants, yucca, and cactus. Twenty-five percent of the century plants that were killed last year had some live sprouts. Some of the cactus seemed to have revived from last year's treatment. Generally this plot was messy with respect to these new seedlings and sprouts. Oak seemed well cleaned up.

"Plot B.--Yucca seemed to survive last year's treatment. Sprayed one or two spotty areas of snakeweed. Sprayed some little forbs. Some forbs in the area were in bloom. With respect to snakeweed, the plot was probably sprayed late (1967).

"Travel.--It took approximately 3 hours from Flagstaff. After leaving U.S. 66, it is 17 miles to a junction. At this junction a right turn is made crossing the creek bottom on a cement ramp. The plot is 12 miles further, making a total of 29 miles from U.S. 66.

"Yampai Plot: Treated March 23, 1967 and April 21, 1966.

"Both plots were very clean. No treatment on Plot B. On Plot A, some spotty areas of snakeweed were sprayed (1967).

"Indian Mountain Plot: Treated March 15, 1967 and April 11, 1966.

"Plot A.--Very clean--possible that Helianthus or some tall similar weed will yet sprout, as yet no green sprouting.

"Plot B.--About the same as lower Plot A, but resprayed cactus and juniper trees. Annual lovegrass on plot. No green growth of this, however.

"Witty Tom Plot: Treated March 16, 1967, April 7, 1966, and approximately May 25, 1966.

"Plot A.--Very clean--treated juniper and cactus with Tordon.

"Plot B.--Some forb seedlings (Helianthus). Some may show later. Also sprayed Verbascum.

"Pretty clean plots (except B with respect to forbs). Country dry; but the forbs, small and apparently beginning to grow, were sprayed with 2,4-D mix. More may sprout later, however.

"Hell Canyon Plots (Drake): Treated March 16, 1967 and April 7, 1966.

"Did not treat basalt plot. Limestone plot in pretty good shape except for cliffrose and some cactus. These were sprayed with Tordon (1967). Plots were dry.

"Walker Plots (Rimrock): Treated March 9, 1967 and April 6, 1966.

"Plot A.--Canotia holacantha heavy on this plot. There was a lot of Astragulus (in bloom). The plot was probably sprayed late this year (1967). However, return on March 28, 1967 shows some effect on Astragulus, large snakeweed plants, and crucifixion thorn (drying and withering of these plants).

"Plot B.--Very good except for cactus. Resprayed this.

"Sand Rock Draw: Treated March 28, 1967 and April 18, 1966.

"In general, the plots were very clean. On Plot A, juniper sprouts were sprayed with Tordon. Also, treated areas of Verbascum with this tordon mix. Treated this mullein last year with 2,4-D with no apparent results.

"Plot B.--No treatment except for some forb growing under the dead tree. Also treated a Ribes cereum plant with the tordon mix.

"Buckhead Mesa: Treated March 28, 1967 and April 23, 1966.

"Plot A.--Sprouting of oak. Quite a few sprouting plants. Some plants obviously unaffected or completedy missed last year. Quite a few plants with burnt leaves, still partially green. Resprayed these. Rhus was in bloom, but no leaves yet. Tordon was the only treatment. Plot was clean of forbs. In general, the plot was messy with respect to oak.

"Plot B.--Many large well developed snakeweed plants; many century plant sprouts and some oak sprouts. Full tordon mix on sprouts and century plants. One-half tordon mix added to 2,4-D sprayed on snakeweed. With respect to the snakeweed, very late for spraying. Possibly was late last year as some plants were only partially killed.

"Carrizo Plot: Treated March 28, 1967 and April 15, 1966.

"Plot A.--Treatment time was late this year (1967). This plot fairly clean except for spotty areas of snakeweed (Tordon + 2,4-D only treatment). Spraying mostly on juniper and pinyon sprouts and seedlings, cactus, and oaksprouts. However, these were not too bad on this plot. Generally, the plot was in good shape except for Eragrostis. Poor job done last year with dalapon. Maybe the lovegrass was not sufficiently showing last year. Some small green leaves were all that was showing this year. Did not treat the lovegrass this year.

"Plot B.--Generally messy with forbs. Sprayed these with 2,4-D. Snakeweed was well cleaned up.

"Travel.--171 miles from Flagstaff via Lone Pine plot.

"Lone Pine Plot: Treated March 27, 1967 and April 14, 1966.

"Both plots were generally messy with snakeweed, especially on Plot A. Plot B was fair to poor. This year (1967) treatment time was good with respect to snakeweed, but very bad conditions (very windy and cloudy). Plot A had many juniper sprouts and seedlings. Both plots, but especially A, was grazed heavily. Snakeweed grazed heavily. This pair of plots has not been fenced (3/28/67).

"Travel.--Approximately 2½ hours from Flagstaff.

"Double A Plots: Treated April 11, 1967 and April 14, 1966.

"Plot A.--The plot was very messy with snakeweed. These plants, however, were small and inconspicuous. There were some larger and more developed plants as well. The treatment was 2,4-D and tordon mix. The Tordon concentration was halved. This was applied to the snakeweed. A full tordon mix was applied to juniper sprouts and Berberis spp. Most of the Berberis spp. was controlled from last year. Six or seven juniper trees were cut. Treatment time was late this year (1967).

"Plot B.--Nearly the same condition as Plot A. Soil moisture was dry down about 5 to 6 inches. Below that the soil was very wet. Plot B did not have the amount of snakeweed as Plot A. Apparently a good job done on snakeweed. Conditons were very windy for spraying this year (1967)."

No further treatments are planned so that reinvasion of the plots by forbs, half shrubs, and shrubs can proceed naturally.

STUDY 1705.10

1967 Progress Report

Regularly scheduled herbage measurements were made on all plots of the study in 1967. A major effort in the study was to develop computer techniques for handling the data and preparing summary reports. Because of the computerized data handling, individual species and plot conversions of estimated dry weight to actual dry weight were possible and confidence limits of dry weight means could thus be computed. The steps in the process which are detailed in the following pages were as follows:

1. Recording all field data on 80-column forms suitable for direct punching.
2. Key punching and verifying of all data, and
   Preparation of a card deck for individual symbols, scientific names, and common names of 181 species found in the study plan. Cards were sorted alphabetically by symbol.
3. Establishment of auxilliary storage area in the computer system. This storage, called "PLIST" was accessible to all subsequent steps.
4. Storage of species names in PLIST for future reference.
5. Print out of a preliminary species list with number designation for each species.
6. Assignment of species identification numbers to field data sheets.
7. Modification of species name file.
8. Computation of general conversion factors for all species.
9. Print out of final species list with general conversion factors.
10. Correction of all fresh weight estimate data to actual dry weight by data and print out of summary tables.

1. Recording all field data on 80-column forms.

Field data was recorded on 80-column forms in the following order:

Card 1. Plot identification in columns 2-56.

Card 2. Columns 1-2 contained the number of species found in the plot. The remainder of the columns were left blank until the tentative species list was prepared.

Cards 3-52. Individual plot cards for estimated fresh weight. Various columns were assigned individual species. Up to 26 species per plot were handled so little or no grouping of species was required. Columns were assigned as follows:

Column 1: Plot identifier (letter). This column provided positive identification in the event of a mixup of cards.

Column 2-3: Sub-plot sequence numbers. Sub-plot numbers 1-10 were assigned to plots clipped in the doubling sampling procedure, other plots were numbered consecutively from 11 to 50.

Column 4-5: A two-column field for a species which had no more than 99 grams estimated fresh weight.

Column 6-9: A four-column field for a species which had up to 9,999 grams estimated fresh weight.

Column 10-75: Twenty-two three-column fields for species fresh weight estimates.

Column 76-79: A four-column field for the same purpose as columns 6-9.

Column 80: A one-column field for species which had no more than nine grams estimated fresh weight.

Cards 53-62: Individual plot cards for actual dry weight data. Columns were identical to those for cards 3-52 so that entries for a given species were in the same columns for all 60 cards. Sub-plot sequence names were assigned consecutively from 1-10, and all sub-plot numbers were paired with cards 3-52 so that estimated sub-plots could be matched with the plots actually clipped.

In the future, another field data sheet format may be found to be more suitable. This would require a simple change in subsequent FORMAT statements.

1 2 3 4 5 6 7 8 9 **10** 11 12 13 14 15 16 17 18 19 **20** 21 22 23 24 25 26 27 28 29 **30** 31 32 33 34 35 36 37 38 39 **40** 41 42 43 44 45 46 47 48 49 **50** 51 52 53 54 55 56 57 58 59 **60** 61 62 63 64 65 66 67 68 69 **70** 71 72 73 74 75 76 77 78 79 **80**

1 **2** **3** **4** 5 6 7 8 9 **10** 11 12 13 14 15 16 17 18 19 **20** 21 22 23 24 **25** 26 27 28 29 **30** 31 32 33 34 35 36 37 38 39 **40**

1 2 3 4 5 6 7 8 9 **10** 11 12 13 14 15 16 17 18 19 **20** 21 22 23 24 25 26 27 28 29 **30** 31 32 33 34 35 36 37 38 39 **40** 41 42 43 44 45 46 47 48 49 **50** 51 52 53 54 55 56 57 58 59 **60** 61 62 63 64 65 66 67 68 69 **70** 71 72 73 74 75 76 77 78 79 **80**

2. Key punching and verifying of all data and preparation of a card deck of plant names.

This was done by the routine card punching service of Research Support Services.

Name cards for all species were prepared according to the following format:

Column 1-4. Alphabetic plot symbol.

Column 5. Numeric suffix for species symbol.

Column 7-53. Scientific name and authority.

Column 54-80. Common name.

These cards were sorted into alphabetical order by plant symbol and read into PLIST by the program shown on ~~the following~~ page 6. A temporary conversion factor of 5.0 and matched plot counts of 0 were established at card read in time.

3. Establishment of an auxilliary storage area PLIST.

By the simple instructions shown on the next page, an auxilliary storage area adequate for storing the species list and conversion factors was established. This storage area was named PLIST for future reference and was accessible for all subsequent steps in the computation.

```
// JOB
// DUP

*STOREDATA  WS  UA  PLIST   50

1B80 0320
```

4. Storage of species names in PLIST was accomplished by the program on the following page.

```
// JOB
// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
*IOCS(CARD,DISK,1132PRINTER)
C       READ IN OF SPECIES NAME CARDS
        COMMON NREC,NAME(43),KAME(23)
        DEFINE FILE 1(200,76,U,NREC)
C       CONV=ARBITRARY CONSTANT TO BE REPLACED LATER BY COMPUTED CONSTANT
        CONV=5.0
        KOUNT=0
C       READ SPECIES NAME CARDS AND FILE ON DISK
        DO 3 I=1,200
        READ (2,2) SYM,NSUFX,SCIEN,(NAME(J),J=1,43),COMMN,(KAME(J),J=1,23)
      2 FORMAT(A4,I1,1X,A4,43A1,A4,23A1)
      3 WRITE(1'I)CONV,KOUNT,
     1                SYM,NSUFX,SCIEN,(NAME(J),J=1,43),COMMN,(KAME(J),J=1,23)
        CALL EXIT
        END
FEATURES SUPPORTED
 ONE WORD INTEGERS
 IOCS

CORE REQUIREMENTS FOR
 COMMON       68  VARIABLES      22  PROGRAM      164

END OF COMPILATION

// XEQ
*FILES(1,PLIST)
```

5. Print out of preliminary species list.

The contents of PLIST were printed out by the program on the following page.

```
// JOB
// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
*IOCS(CARD,DISK,1132PRINTER)
C       PRINT OUT OF CONVERSION FACTORS AND SPECIES LIST
        COMMON NREC,NAME(43),KAME(23)
        DEFINE FILE 1(200,76,U,NREC)
        DO 1 I=1,200
        READ(1'I) CONV,KOUNT, SYM,NSUFX,SCIEN,(NAME(J),J=1,43),
       1COMMN,(KAME(J),J=1,23)
    1   WRITE(3,2)I,CONV,KOUNT, SYM,NSUFX,SCIEN,(NAME(J),J=1,43),
       1COMMN,(KAME(J),J=1,23)
    2   FORMAT(1H I5,F6.3,I5,2XA4,1X11,5XA4,43A1,5XA4,23A1)
        CALL EXIT
        END

FEATURES SUPPORTED
 ONE WORD INTEGERS
 IOCS

CORE REQUIREMENTS FOR
 COMMON      68  VARIABLES      22  PROGRAM     166

END OF COMPILATION

// XEQ          1
```

6. Assignment of species identification number to field data sheets.

Numbers from the print out of PLIST were inserted in card 2 of the field data deck to provide identification of the columns of weights. Identification numbers were in the same sequence as the data column, but only three column fields were used:

Columns 1-2. Number of species in plot.

Columns 3-80. Twenty-six three-column identification fields.

7. Modification of species name file.

Three additional species were located in step 5 and added to PLIST by the program on the following page.

```
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
*IOCS(CARD,DISK,1132PRINTER)
C       MODIFICATION OF SPECIES LIST
        COMMON NREC,NAME(43),KAME(23)
        DEFINE FILE 1(200,76,U,NREC)
C       CONV=ARBITRARY CONSTANT TO BE REPLACED LATER BY COMPUTED CONSTANT
        CONV=5.0
        KOUNT=0
C       READ SPECIES NAME CARDS AND FILE ON DISK
        DO 3 I=179,181
        READ (2,2) SYM,NSUFX,SCIEN,(NAME(J),J=1,43),COMMN,(KAME(J),J=1,23)
    2   FORMAT(A4,I1,1X,A4,43A1,A4,23A1)
    3   WRITE(1'I)CONV,KOUNT,
     1            SYM,NSUFX,SCIEN,(NAME(J),J=1,43),COMMN,(KAME(J),J=1,23)
        CALL EXIT
        END

FEATURES SUPPORTED
 ONE WORD INTEGERS
 IOCS

CORE REQUIREMENTS FOR
 COMMON      68  VARIABLES      22  PROGRAM     164

END OF COMPILATION




// XEQ          1
*FILES(1,PLIST)
```

8. Computation of general conversion factors.

All cards for estimated weights and clipped weights were fed through the program on the next page. This program matched weight estimates from sub-plots 1-10 with the appropriate clipped plot data. Ratios of estimated clipped weights were accumulated for each species, and, when all data were in, the accumulated ratios were divided by the number of matched plots. This is the procedure for a regression line computation with the line passing through the origin. The conversion factors and counts were filed in PLIST, and the conversion factors were also punched out on cards.

```
// JOB
// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
*IOCS(CARD,DISK,1132PRINTER)
C       PASS 1 OF DATA CARDS TO ESTABLISH GENERAL CONVERSION FACTORS
        DIMENSION C(5,40),KN(5,40)
        COMMON NREC,CONV(200),KOUNT(200),NAME(30),ITEMP(30),IX(30,10),
       1NX(30,10)
        DEFINE FILE 1(200,76,U,NREC)
C       INITIALIZE
C       NEST,NCLIP,SIZE FACTOR,,IPLOT, AND NSPEC SPECIFIED HERE
        IPLOT=24
        NSPEC=200
        NEST=50
        NCLIP=10
        SIZE=10.0
        DO 1 I=1,NSPEC
        CONV(I)=0.0
      1 KOUNT(I)=0
        DO 10 LOT=1,IPLOT
C       MONITOR COMPUTATION SO FAR WITH DATSW 1
        CALL DATSW(1,JON)
        GO TO (101,102),JON
    101 WRITE(3,15)(CONV(I),KOUNT(I),I= 6,10)
C       READ PLOT HEADER
    102 READ(2,2)
      2 FORMAT(55H                                                    )
C       READ NAME-FILE CARD
        READ(2,3)NI,(NAME(I),I=1,NI)
      3 FORMAT(I2,26I3)
        DO 6 IEST=1,NEST
C       READ ESTIMATE CARD,RETAIN IF J IS LESS THAN OR EQUAL TO NCLIP
        READ(2,13)J,(ITEMP(I),I=1,NI)
     13 FORMAT(1X2I2,I4,22I3,I4,I1)
        IF(J-NCLIP)4,4,6
      4 DO 5 I=1,NI
      5 IX(I,J)=ITEMP(I)
      6 CONTINUE
        DO 7 ICL=1,NCLIP
C       READ CLIP CARDS
      7 READ(2,13)J,(NX(I,J),I=1,NI)
```

```
      DO 10 I=1,NI
      K=NAME(I)
C     COMPUTE CONVERSION FACTORS
      DO 10 J=1,NCLIP
      IF(NX(I,J))10,10,8
    8 IF(IX(I,J))10,10,9
    9 A=NX(I,J)
      B=IX(I,J)
      CONV(K)=CONV(K)+A/B
      KOUNT(K)=KOUNT(K)+1
   10 CONTINUE
C     WRITE NEW FACTORS ON DISK FILE
      DO 12 K=1,NSPEC
      IF(KOUNT(K))19,19,11
   19 CONV(K)=5.0
      GO TO 111
   11 CONV(K)=CONV(K)/KOUNT(K)
      CONV(K)=CONV(K)*SIZE
  111 WRITE(1'K)CONV(K),KOUNT(K)
   12 CONTINUE
      READ(2,3)
      NREC=1
      DO 23 J=1,40
      DO 23 I=1,5
   23 READ(1'NREC) C(I,J),KN(I,J)
      DO 14 J=1,40
   14 WRITE (3,15) (C(I,J),KN(I,J),I=1,5)
   15 FORMAT(1H 5(F16.6,I8))
      DO 16 J=1,40
   16 WRITE (2,17) (C(I,J),KN(I,J),I=1,5)
   17 FORMAT(5(F12.6,I4))
      CALL EXIT
      END
```

9. Print out of final species list and conversion factors.

The program of step 5 was again used to print out the final conversion factors and species list from PLIST. Copies of the final list are given on the following pages in two sections. The first section is a photocopy of the computer print out except that the common names have been omitted because of the paper width. The second section includes scientific names and common names but no symbols.

1	5.000	0	ACAC	0	ACACIA
2	5.000	0	AGAV	0	AGAVE
3	5.571	1	AGDE	0	AGROPYRON DESETORUM(FISCH.)SCHUTT.
4	3.666	1	AGIN	0	AGROPYRON INTERMEDIUM(HOST)BEAUV.
5	1.666	1	AGOS	0	AGOSERIS
6	5.000	0	AGSM	0	AGROPYRON SMITHII RYDB.
7	5.000	0	AGUT	0	AGAVE UTAHENSIS ENGELM.
8	5.000	0	AMAR	0	AMARANTHUS
9	3.561	13	AMPO	0	AMARANTHUS POWELLII WATS.
10	5.000	0	AMPS	0	AMBROSIA PSILOSTACHYA DC.
11	5.000	0	ANBA	0	ANDROPOGON BARBINODIS LAG.
12	7.468	18	ANGR	0	MISCELLANEOUS ANNUAL GRASS
13	7.108	13	ANWE	0	MISCELLEANEOUS ANNUAL FORBS
14	5.000	0	AREN	0	ARENARIA
15	6.862	0	ARFE	1	ARISTIDA FENDLERIANA STEUD.
16	6.862	21	ARIS	0	ARISTIDA
17	5.000	0	ARLU	0	ARTEMESIA LUDOVICIANA NUTT.
18	5.000	0	ARTE	0	ARTEMESIA
19	5.000	0	ARTR	0	ARTEMESIA TRIDENTATA NUTT.
20	5.000	0	ASCL	0	ASCLEPIAS
21	5.000	0	ASTE	0	ASTER
22	5.238	2	ASTR	0	ASTRAGALUS
23	5.000	0	ATCA	0	ATRIPLEX CANESCENS PURSH NUTT
24	5.000	0	ATRI	0	ATRIPLEX
25	5.000	0	BACC	0	BACCHARIS
26	2.857	1	BADI	0	BAHIA DISSECTA A. GRAY BRITTON
27	5.000	0	BAMU	0	BAILEYA MULTIRADIATA HARV. & A. GRAY
28	5.000	0	BERB	0	BERBERIS
29	5.000	0	BOAR	0	BOUTELOUA ARISTIDOIDES H.B.K. GRISEB.
30	12.796	53	BOCU	0	BOUTELOUA CURTIPENDULA MICHX. TORR.
31	8.880	13	BOER	0	BOUTELOUA ERIOPODA TORR.
32	8.437	101	BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.
33	5.780	27	BOHI	0	BOUTELOUA HIRSUTA LAG.
34	3.333	1	BOUT	0	BOUTELOUA
35	5.000	0	BROM	0	BROMUS
36	5.000	0	BRRU	1	BROMUS RUBENS L.
37	5.000	0	CAHO	0	CANOTIA HOLACANTHA TORR.
38	3.160	5	CALO	0	CALOCHORTUS
39	5.000	1	CARE	0	CAREX
40	5.000	0	CAST	0	CASTILLEJA
41	1.956	1	CHAL	0	CHENOPODIUM ALBUM L.
42	1.956	0	CHEN	0	CHENOPODIUM
43	5.000	0	CHMI	0	CHAMAEBATIARIA MILLEFOLIUM TORR. MAXIM.
44	5.000	0	CHNA	0	CHRYSOTHAMNUS NAUSEOSUS PALL. BRITT.
45	7.523	9	CHVI	1	CHLORIS VIRGATA SWARTZ
46	5.000	0	CIRS	0	CIRSIUM
47	5.000	0	COME	1	COWANIA MEXICANA D. DON
48	5.000	0	CORA	1	COLEOGYNE RAMOSISSIMA TORR.
49	5.000	0	COWR	0	CORDYLANTHUS WRIGHTII A. GRAY
50	3.222	2	CRYP	0	CRYPTANTHA
51	5.000	0	CYDA	0	CYNODON DACTYLON L. PERS.
52	1.100	1	DAST	0	DATURA STRAMONIUM L.
53	3.662	8	DECO	0	DESMANTHUS COOLEYI EATON TREL.
54	5.377	11	DEPI	0	DESCURAINIA PINNATA WALT. BRITT.
55	5.000	0	ECHI	2	ECHINOCEREUS

56	5.000	0	ECHI 3	ECHINOCACTUS
57	4.500	1	EPVI 0	EPHEDRA VIRIDIS COVILLE
58	5.000	0	ERAG 0	ERAGROSTIS
59	10.000	1	ERCI 1	ERODIUM CICUTARIUM L. L HER.
60	5.000	0	ERCO 2	ERIGERON CONCINNUS HOOK. & ARN. TORR. & GRAY
61	11.666	3	ERCO 9	ERIOGONUM COGNATUM GREENE
62	10.216	4	ERCU 0	ERAGROSTIS CURVULA SCHRAD. NEES
63	1.681	6	ERDI 2	ERIGERON DIVERGENS TORR. & GRAY
64	5.000	0	ERFL 1	ERIGERON FLAGELLARIS A. GRAY
65	3.866	9	ERFO 0	ERIGERON FORMOSISSIMUS GREENE
66	5.000	0	ERIG 0	ERIGERON
67	5.309	6	ERIN 1	ERAGROSTIS INTERMEDIA HITCHC.
68	5.000	0	ERIO 1	ERIOGONUM
69	5.000	0	ERJA 0	ERIOGONUM JAMESII BENTH.
70	5.000	0	ERRA 0	ERIOGONUM RACEMOSUM NUTT.
71	2.000	1	ERSI 0	ERIOGONUM SIMPONII BENTH.
72	4.750	5	ERWR 0	ERIOGONUM WRIGHTII TORR.
73	5.000	0	EULA 1	EUROTIA LANATA PURSH MOQ.
74	5.126	33	EUPH 0	EUPHORBIA
75	5.000	0	FAPA 0	FALLUGIA PARADOXA D. DON ENDL.
76	5.000	0	FEOC 0	FESTUCA OCTOFLORA WALT.
77	5.000	0	GIMU 0	GILIA MULTIFLORA NUTT.
78	7.074	9	GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY
79	2.047	2	HEAN 0	HELIANTHUS ANNUUS L.
80	4.279	2	HIBE 0	HILARIA BELANGERI STEUD. NASH
81	10.006	3	HIJA 0	HILARIA JAMESII TORR. BENTH.
82	9.168	17	HIMU 0	HILARIA MUTICA BUCKL. BENTH.
83	5.000	0	HYAC 0	HYMENOXYS ACAULIS PURSH K.F. PARKER
84	5.000	0	HYCO 0	HYMENOXIS COOPERI(GRAY)COCKERELL
85	4.156	16	HYLO 0	HYMENOTHRIX LOOMSII BLAKE
86	5.000	0	HYLU 0	HYMENOPAPPUS LUGENS GREENE
87	6.381	6	HYME 1	HYMENOXYS
88	1.500	1	HYRI 0	HYMENOXYS RICHARDSONII HOOK. COCKERELL
89	8.000	1	HYRU 0	HYMENOXIS RUSBYI(GRAY)COCKERELL
90	5.000	0	JUDE 0	JUNIPERUS DEPPEANA STEUD.
91	5.000	0	JUMO 0	JUNIPERUS MONOSPERMA ENGELM. SARG.
92	5.000	0	JUOS 0	JUNIPERUS OSTEOSPERMA TORR. LITTLE
93	7.826	1	KOCR 0	KOELERIA CRISTATA L. PERS.
94	5.000	0	LACT 0	LACTUCA
95	5.000	0	LAPP 0	LAPPULA
96	5.000	0	LARE 0	LAPPULA REDOWSKII(HORNEM.)GREENE
97	5.000	0	LEFR 0	LEPIDIUM FREMONTII S. WATS.
98	4.000	1	LEPI 0	LEPIDIUM
99	5.000	0	LESQ 0	LESQUERELLA
100	5.000	0	LOMA 0	LOMATIUM
101	3.500	2	LOWR 0	LOTUS WRIGHTII A. GRAY GREENE
102	5.000	0	LUPI 0	LUPINUS
103	5.000	0	LYCI 0	LYCIUM
104	4.193	7	LYPH 0	LYCURUS PHLEOIDES H.B.K.
105	5.000	0	MAMM 0	MAMMILLARIA
106	5.000	0	MEOF 0	MELILOTUS OFFICINALIS L. LAM.
107	5.625	2	MESC 1	MENODORA SCABRA A. GRAY
108	5.000	0	MIBI 3	MIMOSA BIUNCIFERA BENTH.
109	5.000	0	MIMU 0	MIRABILIS MULTIFLORA(TORR.)A.GRAY
110	5.000	0	MIRA 0	MIRABILIS
111	4.103	3	MUEM 0	MUHLENBERGIA EMERSLEYI VASEY
112	5.000	0	MUSQ 0	MUNROA SQUARROSA NUTT. TORR.
113	2.839	4	MUTO 0	MUHLENBERGIA TORREYI KUNTH HITCHC.

114	5.521	2	MUWR	0	MUHLENBERGIA WRIGHTII VASEY
115	5.000	0	NOMI	0	NOLINA MICROCARPA S.WATS.
116	5.000	0	OPEN	0	OPUNTIA ENGELMANNII SALM-DYCK
117	5.000	0	OPUN	1	OPUNTIA
118	5.000	0	OPUN	2	OPUNTIA
119	13.649	11	ORHY	0	ORYZOPSIS HYMENOIDES ROEM. & SCHULT. RICKE
120	5.000	0	ORMI	0	ORYZOPSIS MICRANTHA TRIN. & RUPR. THURB
121	5.000	0	OXAL	0	OXALIS
122	5.000	0	OXLA	0	OXYTROPIS LAMBERTII PURSH
123	5.624	4	PANI	0	PANICUM
124	6.617	8	PAOB	0	PANICUM OBTUSUM H.B.K.
125	5.000	0	PEBA	0	PENSTEMON BARBATUS(CAV.)ROTH
126	4.027	6	PELI	0	PENSTEMON LINARIODES A. GRAY
127	4.253	2	PENS	0	PENSTEMON
128	2.818	2	PEPA	1	PECTIS PAPPOSA HARV. & GRAY
129	5.000	0	PEVI	0	PENSTEMON VIRGATUS A.GRAY
130	5.000	0	PHAC	0	PHACELIA
131	5.000	0	PHLO	0	PHLOX
132	3.059	7	PHYS	0	PHYSALIS
133	5.000	0	PIPO	0	PINUS PONDEROSA LAWSON
134	5.000	0	PLAN	1	PLANTAGO
135	4.966	7	POFE	0	POA FENDLERIANA STEUD. VASEY
136	6.497	5	POLO	0	POA LONGILIGULA SCRIBN. & WILLIAMS
137	5.000	0	POLY	2	POLYGALA
138	8.333	1	POLY	3	POLYGONUM
139	6.081	7	POOL	0	PORTULACA OLERACEA L.
140	4.166	2	PSOR	0	PSORALEA
141	5.000	0	QUGA	0	QUERCUS GAMBELII NUTT.
142	5.000	0	QUTU	0	QUERCUS TURBINELLA GREENE
143	5.000	0	RHCR	0	RHAMNUS CROCEA NUTT.
144	5.000	0	RHTR	0	RHUS TRILOBATA NUTT.
145	6.027	2	SAKA	0	SALSOLA KALI L.
146	5.000	0	SCIR	0	SCIRPUS
147	0.800	1	SEDU	0	SEDUM
148	1.333	1	SELO	0	SENECIO LONGILOBUS BENTH.
149	6.428	2	SENE	0	SENECIO NEOMEXICANUS A. GRAY
150	5.000	0	SETA	0	SETARIA
151	5.000	0	SIAC	0	SILENE ACAULIS L.
152	6.524	66	SIHY	0	SITANION HYSTRIX NUTT. J.G. SMITH
153	5.000	0	SOMI	0	SOLIDAGO MISSOURIENSIS NUTT.
154	5.000	0	SPAI	0	SPOROBOLUS AIROIDES TORR.
155	4.479	4	SPCO	0	SPOROBOLUS CONTRACTUS HITCHC.
156	10.026	32	SPCR	0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY
157	2.733	2	SPHA	0	SPHAERALCEA
158	8.026	1	SPIN	1	SPOROBOLUS INTERRUPTUS VASEY
159	5.000	0	SPOR	0	SPOROBOLUS
160	11.641	2	STIP	0	STIPA
161	5.000	0	STSP	0	STIPA SPECIOSA TRIN. & RUPR.
162	5.000	0	TARA	0	TARAXACUM
163	5.000	0	THAL	0	THALICTRUM
164	5.000	0	TRAG	1	TRAGOPOGON
165	3.272	2	TREL	0	TRIDENS ELONGATUS BUCKL. NASH
166	5.000	0	TRID	0	TRIDENS
167	14.463	3	TRPI	0	TRIDENS PILOSUS BUCKL. HITCHC.
168	9.513	4	TRPU	0	TRIDENS PULCHELLUS H.B.K. HITCHC.
169	5.000	0	UNGR	0	MISCELLANEOUS PERENNIAL GRASSES
170	0.285	1	URTI	0	URTICA
171	4.761	1	VETH	0	VERBASCUM THAPSUS L.

172	5.639	13	VIAN	0	VIGUIERA ANNUA JONES BLAKE
173	0.580	1	VIAR	0	VITIS ARIZONICA ENGELM
174	5.000	0	VICI	0	VICIA
175	5.000	0	VIMU	0	VIGUIERA MULTIFLORA(NUTT.)BLAKE
176	5.000	0	YUBA	0	YUCCA BACCATA TORR.
177	5.000	0	YUEL	0	YUCCA ELATA ENGELM.
178	5.000	0	YUGL	0	YUCCA GLAUCA NUTT.
179	3.898	13	ASAR	0	ASTER ARENOSUS(HELLER)BLAKE
180	5.000	0	VEWR	0	VERBENA WRIGHTII A. GRAY
181	10.000	1	CEPA	1	CENCHRUS PAUCIFLORUS BENTH.
182	5.000	0		0	
183	5.000	0		0	
184	5.000	0		0	
185	5.000	0		0	
186	5.000	0		0	
187	5.000	0		0	
188	5.000	0		0	
189	5.000	0		0	
190	5.000	0		0	
191	5.000	0		0	
192	5.000	0		0	
193	5.000	0		0	
194	5.000	0		0	
195	5.000	0		0	
196	5.000	0		0	
197	5.000	0		0	
198	5.000	0		0	
199	2.250	1		0	
200	5.000	0	SUM	0	

```
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
*IOCS(CARD,DISK,1132PRINTER)
C       MODIFICATION OF SPECIES LIST
        COMMON NREC,NAME(43),KAME(23)
        DEFINE FILE 1(200,76,U,NREC)
C       CONV=ARBITRARY CONSTANT TO BE REPLACED LATER BY COMPUTED CONSTANT
        CONV=5.0
        KOUNT=0
C       READ SPECIES NAME CARDS AND FILE ON DISK
        DO 3 I=179,181
        READ (2,2) SYM,NSUFX,SCIEN,(NAME(J),J=1,43),COMMN,(KAME(J),J=1,23)
      2 FORMAT(A4,I1,1X,A4,43A1,A4,23A1)
      3 WRITE(1'I)CONV,KOUNT,
       1           SYM,NSUFX,SCIEN,(NAME(J),J=1,43),COMMN,(KAME(J),J=1,23)
        CALL EXIT
        END

FEATURES SUPPORTED
 ONE WORD INTEGERS
 IOCS

CORE REQUIREMENTS FOR
 COMMON      68  VARIABLES      22  PROGRAM     164

END OF COMPILATION




// XEQ          1
*FILES(1,PLIST)
```

CHECK LIST FOR STUDY 1705.10

ACAC		Acacia	Acacia
AGAV		Agave	Agave
AGDE		Agropyron desetorum (Fisch.) Schutt.	Crested weatgrass (1)
AGIN		Agropyron intermedium (Host) Beauv.	Intermediate wheatgrass
AGOS		Agoseris	Agoseris
AGSM		Agropyron smithii Rydb.	Western wheatgrass
AGUT		Agave utahensis Engelm.	Utah agave
AMAR		Amaranthus	Amaranth
AMPO		Amaranthus powellii Wats.	(1)
AMPS		Ambrosia psilostachya DC.	Western ragweed
ANBA		Andropogon barbinodis Lag.	Cane bluestem
ANGR		Miscellaneous annual grass	
ANWE		Miscellaneous annual forbs	
AREN		Arenaria	Sandwort
ARFE	1	Aristida fendleriana Steud.	Fendler three-awn
ARIS		Aristida	Three-awn
ARLU		Artemesia ludoviciana Nutt.	Louisiana wormwood
ARTE		Artemesia	Sagebrush
ARTR		Artemesia tridentata Nutt.	Big sagebrush
ASCL		Asclepias	Milkweed
ASTE		Aster	Aster
ASTR		Astragalus	Loco
ATCA		Atriplex canescens Pursh. Nutt.	Fourwing saltbush
ATRI		Atriplex	Saltbush
BACC		Baccharis	Baccharis
BADI		Bahia dissecta A. Gray Britton	Ragleaf bahia
BAMU		Baileya multiradiata Harv. & A. Gray	Desert baileya
BERB		Berberis	Barberry
BOAR		Bouteloua aristidoides H.B.K. Griseb.	Needle grama
BOCU		Bouteloua curtipendula Michx. Torr.	Side-oats grama
BOER		Bouteloua eriopoda Torr.	Black grama
BOGR		Bouteloua gracilis H.B.K. Lag.	Blue grama
BOHI		Bouteloua hirsuta Lag.	Hairy grama
BOUT		Bouteloua	Grama
BROM		Bromus	Chess
BRRU	1	Bromus rubens L.	Foxtail chess
CAHO		Canotia holacantha Torr.	Canotia
CALO		Calochortus	Mariposa
CARE		Carex	Sedge
CAST		Castilleja	Paintbrush
CHAL		Chenopodium album L.	Lambsquarters goosefoot
CHEN		Chenopodium	Goosefoot
CHMI		Chamaebatiaria millefolium Torr. Maxim.	Fernbush
CHNA		Chrysothamnus nauseosus Pall. Britt.	Rubber rabbitbrush
CHVI	1	Chloris virgata Swartz	Feather fingergrass
CIRS		Cirsium	Thistle
COME	1	Cowania mexicana D. Don	Cliffrose

CORA	1	Coleogyne ramosissima Torr.	Blackbrush
COWR		Cordylanthus wrightii A. Gray	Plumeweed clubflower
CRYP		Cryptantha	Hiddenflower
CYDA		Cynodon dactylon L. Pers.	Bermudagrass
DAST		Datura stramonium L.	Jimpson weed
DECO		Desmanthus cooleyi Eaton Trel.	James bundleflower
DEPI		Descurainia pinnata Walt. Britt.	Pinnate tansymustard
ECHI	2	Echinocereus	Echinocereus
ECHI	3	Echinocactus	Echinocactus
EPVI		Ephedra viridis Coville	Green ephedra
ERAG		Eragrostis	Lovegrass
ERCO	1	Erodium cicutarium L. Lher.	Filaree
ERCO	2	Erigeron concinnus Hook. & Arn. Torr. & Gray	Hairy fleabane
ERCO	9	Eriogonum cognatum Greene	Wildbuckwheat
ERCU		Eragrostis curvula Schrad. Nees	Weeping lovegrass
ERDI	2	Erigeron divergens Torr. & Gray	Spreading fleabane
ERFL	1	Erigeron flagellaris A. Gray	Trailing fleabane
ERFO		Erigeron formosissimus greene	
ERIG		Erigeron	Fleabane
ERIN	1	Eragrostis intermedia Hitchc.	Plains lovegrass
ERIO	1	Eriogonum	Buckwheat
ERJA		Eriogonum jamesii Benth.	Antelope-sage buckwheat
ERRA		Eriogonum racemosum Nutt.	Redroot buckwheat
ERSI		Eriogonum simpońii Benth.	Simpsons buckwheat
ERWR		Eriogonum wrightii Torr.	Wright buckwheat
EULA	1	Eurotia lanata Pursh. Moq.	Winterfat
EUPH		Euphorbia	Spurge
FAPA		Fallugia paradoxa D. Don Endl.	Apache-plume
FEOC		Festuca octoflora Walt.	Sixweeks fescue
GIMU		Gilia multiflora Nutt.	Woody gilia
GUSA		Gutierrezia sarothrae Pursh. Britt. & Rusby	Broom snakeweed
HEAN		Helianthus annuus L.	Kansas Sunflower
HIBE		Hilaria belangeri Steud. Nash	Curlymesquite
HIJA		Hilaria jamesii Torr. Benth.	Galleta
HIMU		Hilaria mutica Buckl. Benth.	Tobosa-grass
HYAC		Hymenoxys acaulis Pursh K. F. Parker	Stemless hymenoxys
HYCO		Hymenoxis cooperi (Gray) Cockerell	Coopers actinea
HYLO		Hymenthrix loomsii Blake	
HYLU		Hymenopappus lugens Greene	
HYME	1	Hymenoxys	Hymenoxys
HYRI		Hymenoxys richardsonii Hook. Cockerell	Pingue
HYRU		Hymenoxis rusbyi (Gray) Cockerell	Rusbys actinea
JUDE		Juniperus deppena Steud.	Alligator juniper
JUMO		Juniperus monosperma Engelm. Sarg.	One-seed juniper
JUOS		Juniperus osteosperma Torr. Little	Utah juniper
KOCR		Koeleria cristata L. Pers.	Junegrass
LACT		Lactuca	Lettuce
LAPP		Lappula	Stickseed

LARE		Lappula redowskii (Hornem.) Greene	Redowskis stickseed
LEFR		Lepidium fremontii S. Wats.	Desert pepperweed
LEPI		Lepidium	Pepperweed
LESQ		Lesquerella	Bladderpod
LOMA		Lomatium	Biscuitroot
LOWR		Lotus wrightii A. Gray Greene	Red-and-yellow-pea
LUPI		Lupinus	Lupine
LYCI		Lycium	Wolfberry
LYPH		Lycurus phleoides H.B.K.	Wolftail
MAMM		Mammillaria	Mammillaria
MEOF		Melilotus officinalis L. Lam.	Yellow sweetclover
MESC	1	Menodora scabra A. Gray	Rough menodora
MIBI	3	Mimosa biuncifera Benth.	Wait-a-bit
MIMU		Mirabilis multiflora (Torr.) A. Gray	Wild four-oclock
MIRA		Mirabilis	Four-oclock
MUEM		Muhlenbergia emersleyi Vasey	Bullgrass
MUSQ		Munroa squarrosa Nutt. Torr.	False-buffalograss
MUTO		Muhlenbergia torreyi Kunth Hitchc.	Ring muhly
MUWR		Muhlenbergia wrightii Vasey	Spike muhly
NOMI		Nolina microcarpa S. Wats.	Sacahuita
OPEN		Opuntia engelmannii Salm-Dyck	Engelmann pricklypear
OPUN	1	Opuntia	Pricklypear
OPUN	2	Opuntia	Cholla
ORHY		Oryzopsis hymenoides Roem. & Schult. Ricker	Indian ricegrass
ORMI		Oryzopsis micrantha Trin. & Rupr. Thurb	Littleseed ricegrass
OXAL		Oxalis	Woodsorrel
OXLA		Oxytropis lambertii Pursh.	Lambert crazyweed
PANI		Panicum	Panicum
PAOB		Panicum obtusum H.B.K.	Vine-mesquite
PEBA		Penstemon barbatus (Cav.) Roth	Beardlip penstemon
PELI		Penstemon linariodes A. Gray	Toadflax penstemon
PENS		Penstemon	Penstemon
PEPA	1	Pectis papposa Harv. & Gray	Chinchweed
PEVI		Penstemon virgatus A. Gray	Wandbloom penstemon
PHAC		Phacelia	Phacelia
PHLO		Phlox	Phlox
PHYS		Physalis	Thorn-apple
PIPO		Pinus ponderosa Lawson	Ponderosa pine
PLAN	1	Plantago	Indianwheat
POFE		Poa fendleriana Steud. Vasey	Mutton bluegrass
POLO		Poa longiligula Scribn. & Williams	Longtongue bluegrass
POLY	2	Polygala	Milkwort
POLY	3	Polygonum	Knotweed
POOL		Portulaca oleracea L.	Purslane
PSOR		Psoralea	Scurfpea
QUGA		Quercus gambelii Nutt.	Gambel oak
QUTU		Quercus turbinella Greene	Shrub live oak
RHCR		Rhamnus crocea Nutt.	Hollyleaf buckhorn
RHTR		Rhus trilobata Nutt.	Skunkbush
SAKA		Salsola kali L.	Russianthistle

SCIR		Scirpus	Bulrush
SEDU		Sedum	Stonecrop
SELO		Senecio longilobus Benth.	Threadleaf groundsel
SENE		Senecio neomexicanus A. Gray	New-Mexican groundsel
SETA		Setaria	Bristlegrass
SIAC		Silene acaulis L.	Moss campion
SIHY		Sitanion hystrix Nutt. J. G. Smith	Bottlebrush squirreltail
SOMI		Solidago missouriensis Nutt.	Missouri goldenrod
SPAI		Sporobolus airoides Torr.	Alkali sacaton
SPCO		Sporobolus contractus Hitchc.	Spike dropseed
SPCR		Sporobolus cryptandrus Torr. A. Gray	Sand dropseed
SPHA		Sphaeralcea	Globemallow
SPIN	1	Sporobolus interruptus Vasey	Black dropseed
SPOR		Sporobolus	Dropseed
STIP		Stipa	Needlegrass
STSP		Stipa speciosa Trin. & Rupr.	Desert needlegrass
TARA		Taraxacum	Dandelion
THAL		Thalictrum	Meadowrue
TRAG	1	Tragopogon	Goatsbeard
TREL		Tridens elongatus Buckl. Nash	Rough tridens
TRID		Tridens	Tridens
TRPI		Tridens pilosus Buckl. Hitch.	Hairy tridens
TRPU		Tridens pulchellus H.B.K. Hitchc.	Fluffgrass
UNGR		Miscellaneous perennial grasses	
URTI		Urtica	Nettle
VETH		Verbascum thapsus L.	Flannel mullein
VIAN		Viguiera annua Jones Blake	Annual goldeneye
VIAR		Vitis arizonica Engelm.	Grape
VICI		Vicia	Vetch
VIMU		Viguiera multiflora (Nutt.) Blake	Showy goldeneye
YUBA		Yucca baccata Torr.	Blue yucca
YUEL		Yucca elata Engelm.	Soaptree yucca
YUGL		Yucca glauca Nutt.	Small soapweed

(1) Indicates this species not listed in "Range Plants of Arizona and New Mexico; Names, Symbols, and Notations."

ADDENDA TO CHECK LIST

ASAR	Aster arenosus (Heller) Blake		(1)
VEWN	Verbena wrightii A. Gray	Wrights verbena	
CEPA- 1	Cenchrus paciciflorus Benth	Field sandbur	

10. Print out of summary tables.

All plot data passed through the program on the next page to make a sub-plot by sub-plot conversions to dry weight and preparation of summary tables. Conversion factors peculiar to the plot were used instead of the general conversion factors computed in step 7 if there were three or more matched between estimated and clipped data for the species. In general, the plot conversion factors and general factors were in close agreement. For each table entry, the species name in PLIST corresponding to the species identification number in the plot deck were printed out. Following the program are copies of the plot summary print outs with the common names omitted because of the paper width.

```
// JOB
// FOR
*LIST SOURCE PROGRAM
*ONE WORD INTEGERS
*IOCS(CARD,DISK,1132PRINTER)
C     FINAL PASS PRODUCTION DATA
      DIMENSION VARE(27),NAM(43),KAME(23),CONV(27),KOUNT(27),NAME(27),
     1D(27,50),IE(27,50),DRY(27),EST(27)
      DEFINE FILE 1(200,76,U,NREC)
C     NEST,NCLIP, SIZE FACTOR, MINIMUM MATCHED PLOTS AND T SPECIFIED HERE
      NEST=50
      NCLIP=10
      SIZE=10.0
      MATCH=3
      T=2.009
      IPLOT=24
      NSPEC=200
      DO 206 NPLOT=1,IPLOT
C     READ IN TWO HEADER CARDS
  101 READ(2,102)
  102 FORMAT(55H
      READ(2,103) NI,(NAME(I),I=1,NI)
  103 FORMAT(I2,26I3)
      NI1=NI+1
      NAME(NI1)=NSPEC
C     READ ESTIMATE CARDS
      DO 121 L=1,NEST
  121 READ(2,122) J,(IE(I,J),I=1,NI)
  122 FORMAT(1X2I2,I4,22I3,I4,I1)
      DO 134 L=1,NCLIP
  134 READ(2,123)J,( D(I,J),I=1,NI)
  123 FORMAT(1XI2,F2.0,F4.0,22F3.0,F4.0,F1.0)
C     INITIALIZE
      DO 144 I=1,NI1
      CONV(I)=0.0
      DRY(I)=0.0
      EST(I)=0.0
  144 KOUNT(I)=0
C     COMPUTE INDIVIDUAL DRY/FRESH RATIOS FOR MATCHED PLOTS
      DO 154 I=1,NI
      DO 154 J=1,NCLIP
      IF( D(I,J))154,154,152
  152 IF(IE(I,J))154,154,153
  153 CONV(I)=CONV(I)+D(I,J)/IE(I,J)
      KOUNT(I)=KOUNT(I)+1
  154 CONTINUE
C     CHECK FOR MATCHED PLOTS=MATCH, IF LESS USE GENERAL FACTOR
      DO 165 I=1,NI
      IF(KOUNT(I)-MATCH)164,163,163
  163 CONV(I)=CONV(I)/KOUNT(I)
C     MULTIPLY BY SIZE FACTOR FOR PLOT SIZE
      CONV(I)=CONV(I)*SIZE
      GO TO 165
  164 KN=NAME(I)
      READ(1'KN) CON,KNT
      CONV(I)=CON
      KOUNT(I)=KNT
```

```
      READ(1'KN) CON,KNT
      CONV(I)=CON
      KOUNT(I)=KNT
  165 CONTINUE
      COMPUTE TOTAL FOR ALL SPECIES AND ESTABLISH DRY WEIGHT MATRIX
      DO 172 J=1,NEST
      IE(NI1,J)=0
       D(NI1,J)=0
      DO 172 I=1,NI
       D(I,J)=IE(I,J)*CONV(I)
       D(NI1,J)= D(NI1,J)+ D(I,J)
  172 IE(NI1,J)=IE(NI1,J)+IE(I,J)
C     COMPUTE MEANS
      DO 182 I=1,NI1
      DO 181 J=1,NEST
      DRY(I)=DRY(I)+ D(I,J)
  181 EST(I)=EST(I)+IE(I,J)
      DRY(I)=DRY(I)/NEST
  182 EST(I)=EST(I)/NEST
C     SUBTRACT MEANS FROM INDIVIDUAL ENTRIES AND COMPUTE STANDARD ERROR
      DO 192 I=1,NI1
      VARE(I)=0.0
      DO 191 J=1,NEST
      D(I,J)=(D(I,J)-DRY(I))
  191 VARE(I)=VARE(I)+(D(I,J)*D(I,J))
  192 VARE(I)=SQRT((VARE(I)/(NEST-1))/NEST)*T
C     PRINT OUT HEADER AND RESULTS
      WRITE(3,201)
  201 FORMAT(1H2)
      WRITE(3,102)
      WRITE(3,202)
  202 FORMAT(1H09X'FRESH WT' 7X
     1                          'DRY WT' 9X'+ OR -' 6X'DRY/FRESH'6X
     1'NR CLIPPED')
      DO 203 I=1,NSPEC
      DO 211 L=1,NI1
      IF(NAME(L)-I)211,213,211
  211 CONTINUE
      GO TO 203
  213 K=NAME(L)
      IF(K-199)212,203,212
  212 READ(1'K) CON,KN, SYM,NSUFX,SCIEN,(NAM(J),J=1,43),
     1COMMN,(KAME(J),J=1,23)
      WRITE(3,205) SYM,NSUFX,SCIEN,(NAM(J),J=1,43),
     1COMMN,(KAME(J),J=1,23)
  205 FORMAT(1H
     1        A4,1XI1,5XA4,43A1,5XA4,23A1)
      WRITE (3,204)EST(L),DRY(L),VARE(L),CONV(L),KOUNT(L)
  204 FORMAT(1H 4F15.3,I15)
  203 CONTINUE
  206 CONTINUE
      CALL EXIT
      END
```

BABBITT LAKE GEM SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	4.040	14.386	13.202	3.561
ARIS 0	ARISTIDA			
	1.160	7.960	10.030	6.862
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	252.360	1793.987	1754.157	7.108
CHAL 0	CHENOPODIUM ALBUM L.			
	0.100	0.195	0.393	1.956
DEPI 0	DESCURAINIA PINNATA WALT. BRITT.			
	62.420	319.319	162.054	5.115
EUPH 0	EUPHORBIA			
	0.140	0.717	0.931	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.080	0.565	1.136	7.074
HIJA 0	HILARIA JAMESII TORR. BENTH.			
	4.540	45.428	65.710	10.006
HYRI 0	HYMENOXYS RICHARDSONII HOOK. COCKERELL			
	0.660	0.990	1.327	1.500
LOWR 0	LOTUS WRIGHTII A. GRAY GREENE			
	1.320	4.620	6.411	3.500
MUWR 0	MUHLENBERGIA WRIGHTII VASEY			
	0.040	0.220	0.443	5.521
ORMI 0	ORYZOPSIS MICRANTHA TRIN. & RUPR. THURB			
	2.700	13.500	27.121	5.000
POOL 0	PORTULACA OLERACEA L.			
	0.940	5.716	8.984	6.081
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	19.560	74.520	84.250	3.809
UNGR 0	MISCELLANEOUS PERENNIAL GRASSES			
	0.400	2.000	4.018	5.000
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.000	0.000	0.000	5.639
ASAR 0	ASTER ARENOSUS(HELLER)BLAKE			
	0.140	0.545	1.096	3.898
SUM 0				
	350.600	2284.674	1739.268	0.000

BABBITT LAKE TORTUGAS SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	1.940	6.908	10.153	3.561
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	4.140	29.429	52.812	7.108
ASTR 0	ASTRAGALUS			
	0.060	0.314	0.631	5.238
BADI 0	BAHIA DISSECTA A. GRAY BRITTON			
	3.660	10.457	10.817	2.857
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	122.300	735.301	237.043	6.012
CARE 0	CAREX			
	0.040	0.200	0.401	5.000
DEPI 0	DESCURAINIA PINNATA WALT. BRITT.			
	8.080	49.078	35.656	6.074
EUPH 0	EUPHORBIA			
	0.040	0.205	0.288	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.200	1.414	2.030	7.074
HYAC 0	HYMENOXYS ACAULIS PURSH K.F. PARKER			
	0.280	1.400	2.278	5.000
PANI 0	PANICUM			
	0.560	3.149	2.545	5.624
PHYS 0	PHYSALIS			
	14.920	45.654	44.107	3.059
POFE 0	POA FENDLERIANA STEUD. VASEY			
	2.200	10.927	21.952	4.966
POOL 0	PORTULACA OLERACEA L.			
	0.040	0.243	0.342	6.081
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	33.360	80.999	62.746	2.428
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.560	4.200	3.421	7.500
ASAR 0	ASTER ARENOSUS(HELLER)BLAKE			
	0.200	0.779	1.566	3.898
SUM 0				
	193.380	982.462	221.364	0.000

DOUBLE A SPRINGERVILLE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	0.080	0.597	0.943	7.468
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.120	0.853	1.450	7.108
ARIS 0	ARISTIDA			
	6.700	45.978	58.413	6.862
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	7.480	95.714	146.321	12.796
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	65.500	546.923	190.099	8.349
CHAL 0	CHENOPODIUM ALBUM L.			
	0.100	0.195	0.393	1.956
DECO 0	DESMANTHUS COOLEYI EATON TREL.			
	4.200	15.381	22.255	3.662
ERCO 9	ERIOGONUM COGNATUM GREENE			
	0.140	1.633	1.895	11.666
ERDI 2	ERIGERON DIVERGENS TORR. & GRAY			
	0.160	0.269	0.540	1.681
EUPH 0	EUPHORBIA			
	6.200	31.784	18.685	5.126
HYRU 0	HYMENOXIS RUSBYI(GRAY)COCKERELL			
	9.440	75.520	65.075	8.000
PAOB 0	PANICUM OBTUSUM H.B.K.			
	0.100	0.661	1.091	6.617
PELI 0	PENSTEMON LINARIODES A. GRAY			
	3.580	14.419	15.040	4.027
PEVI 0	PENSTEMON VIRGATUS A.GRAY			
	0.260	1.300	1.277	5.000
PHYS 0	PHYSALIS			
	0.200	0.611	1.229	3.059
POFE 0	POA FENDLERIANA STEUD. VASEY			
	36.060	176.526	157.183	4.895
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	20.560	132.411	86.314	6.440
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	0.200	2.005	4.028	10.026
SPHA 0	SPHAERALCEA			
	0.060	0.163	0.329	2.733
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	11.460	64.623	125.695	5.639
SUM 0				
	172.600	1207.572	267.804	0.000

DOUBLE A SHOWLOW SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.020	0.142	0.285	7.108
ARIS 0	ARISTIDA			
	2.160	14.823	9.723	6.862
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	73.700	618.919	118.745	8.397
ERCO 9	ERIOGONUM COGNATUM GREENE			
	0.240	2.799	1.841	11.666
EUPH 0	EUPHORBIA			
	1.660	8.510	6.867	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.100	0.707	1.166	7.074
HYRU 0	HYMENOXIS RUSBYI(GRAY)COCKERELL			
	0.340	2.720	2.778	8.000
LACT 0	LACTUCA			
	0.100	0.500	0.717	5.000
PANI 0	PANICUM			
	3.060	17.212	33.894	5.624
PELI 0	PENSTEMON LINARIODES A. GRAY			
	1.320	5.316	3.780	4.027
PEVI 0	PENSTEMON VIRGATUS A.GRAY			
	0.500	2.500	1.703	5.000
POFE 0	POA FENDLERIANA STEUD. VASEY			
	21.780	108.177	103.089	4.966
PSOR 0	PSORALEA			
	0.040	0.166	0.334	4.166
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	8.980	58.587	56.129	6.524
SUM 0				
	114.000	841.081	117.041	0.000

BLACK CANYON SPRINGERVILLE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AGDE 0	AGROPYRON DESETORUM(FISCH.)SCHUTT.			
	0.700	3.399	7.835	5.571
AMPO 0	AMARANTHUS POWELLII WATS.			
	0.120	0.427	0.485	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	2.500	18.671	13.839	7.468
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.080	0.568	0.897	7.108
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	2.200	28.151	35.446	12.796
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	1.300	10.968	22.036	8.437
CIRS 0	CIRSIUM			
	0.120	0.500	0.681	5.000
ERCU 0	ERAGROSTIS CURVULA SCHRAD. NEES			
	0.800	8.173	16.419	10.216
ERWR 0	ERIOGONUM WRIGHTII TORR.			
	0.440	2.090	2.951	4.750
EUPH 0	EUPHORBIA			
	0.500	2.563	1.449	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.280	1.980	2.111	7.074
KOCR 0	KOELERIA CRISTATA L. PERS.			
	0.460	3.600	7.232	7.826
MESC 1	MENODORA SCABRA A. GRAY			
	0.500	2.812	4.212	5.625
ORHY 0	ORYZOPSIS HYMENOIDES ROEM. & SCHULT. RICKER			
	26.020	314.359	217.685	12.081
PHYS 0	PHYSALIS			
	0.800	2.447	4.313	3.059
POOL 0	PORTULACA OLERACEA L.			
	0.060	0.364	0.733	6.081
PSOR 0	PSORALEA			
	0.060	0.249	0.502	4.166
SAKA 0	SALSOLA KALI L.			
	13.600	81.977	127.452	6.027
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	31.260	374.947	170.604	11.994
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	10.200	108.085	58.720	10.596
SPHA 0	SPHAERALCEA			
	0.200	0.546	0.701	2.733
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.900	5.075	8.202	5.639
VEWR 0	VERBENA WRIGHTII A. GRAY			
	0.120	0.600	1.205	5.000
SUM 0				
	93.220	973.161	297.821	0.000

BLACK CANYON TORTUGAS SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	0.020	0.071	0.143	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	0.980	7.319	4.971	7.468
ARIS 0	ARISTIDA			
	0.200	1.372	2.757	6.862
ASTR 0	ASTRAGALUS			
	0.460	2.409	2.409	5.238
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	32.460	537.497	235.800	16.558
BOER 0	BOUTELOUA ERIOPODA TORR.			
	13.040	153.804	76.879	11.794
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	1.340	11.306	17.864	8.437
CIRS 0	CIRSIUM			
	0.040	0.200	0.401	5.000
EPVI 0	EPHEDRA VIRIDIS COVILLE			
	0.440	1.980	3.626	4.500
EUPH 0	EUPHORBIA			
	0.020	0.102	0.205	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.020	0.141	0.284	7.074
KOCR 0	KOELERIA CRISTATA L. PERS.			
	0.060	0.469	0.697	7.826
MIMU 0	MIRABILIS MULTIFLORA(TORR.)A.GRAY			
	0.620	3.100	5.645	5.000
ORHY 0	ORYZOPSIS HYMENOIDES ROEM. & SCHULT. RICKER			
	2.860	39.037	54.280	13.649
PHLO 0	PHLOX			
	0.340	1.700	3.415	5.000
PHYS 0	PHYSALIS			
	0.440	1.346	2.166	3.059
POLO 0	POA LONGILIGULA SCRIBN. & WILLIAMS			
	24.420	158.668	115.337	6.497
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	4.180	41.146	22.802	9.843
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	5.060	58.938	42.561	11.647
STIP 0	STIPA			
	5.080	59.136	51.899	11.641
SUM 0				
	92.080	1079.744	236.018	0.000

YAMPAI SPRINGERVILLE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	0.580	2.065	2.075	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	0.780	5.825	2.436	7.468
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.060	0.426	0.856	7.108
ARIS 0	ARISTIDA			
	1.100	7.548	15.165	6.862
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	10.600	82.800	73.080	7.811
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	43.980	314.087	112.270	7.141
CHAL 0	CHENOPODIUM ALBUM L.			
	1.700	3.326	3.994	1.956
EUPH 0	EUPHORBIA			
	2.600	13.328	5.921	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.100	0.707	1.166	7.074
HIMU 0	HILARIA MUTICA SUCKL. BENTH.			
	35.800	328.216	236.010	9.168
MESC 1	MENODORA SCABRA A. GRAY			
	0.560	3.150	5.677	5.625
PHYS 0	PHYSALIS			
	4.140	12.668	16.118	3.059
POOL 0	PORTULACA OLERACEA L.			
	0.880	5.351	4.396	6.081
SAKA 0	SALSOLA KALI L.			
	5.560	33.514	37.482	6.027
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	22.980	93.639	47.853	4.074
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	4.840	48.526	54.519	10.026
SPHA 0	SPHAERALCEA			
	0.260	0.710	0.781	2.733
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.440	2.481	2.447	5.639
SUM 0				
	136.960	958.374	213.242	0.000

YAMPAI DYE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	0.560	1.994	1.262	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	1.540	11.501	9.404	7.468
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.680	4.833	5.450	7.108
ARIS 0	ARISTIDA			
	0.000	0.000	0.000	6.862
ASTR 0	ASTRAGALUS			
	0.160	0.838	1.216	5.238
BOER 0	BOUTELOUA ERIOPODA TORR.			
	2.860	25.399	49.946	8.880
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	32.600	306.173	88.907	9.391
CHAL 0	CHENOPODIUM ALBUM L.			
	0.640	1.252	2.360	1.956
CIRS 0	CIRSIUM			
	0.020	0.100	0.200	5.000
EUPH 0	EUPHORBIA			
	1.500	7.689	5.692	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.780	5.517	4.302	7.074
MESC 1	MENODORA SCABRA A. GRAY			
	0.160	0.900	1.305	5.625
MUTO 0	MUHLENBERGIA TORREYI KUNTH HITCHC.			
	0.100	0.283	0.407	2.839
ORHY 0	ORYZOPSIS HYMENOIDES ROEM. & SCHULT. RICKER			
	12.460	181.233	115.291	14.545
PHYS 0	PHYSALIS			
	16.300	49.877	42.806	3.059
POOL 0	PORTULACA OLERACEA L.			
	0.080	0.486	0.684	6.081
SAKA 0	SALSOLA KALI L.			
	62.920	379.267	539.222	6.027
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	11.840	77.246	58.107	6.524
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	12.280	112.771	75.720	9.183
SPHA 0	SPHAERALCEA			
	1.320	3.607	7.137	2.733
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	1.220	6.879	3.608	5.639
SUM 0				
	160.040	1177.897	524.341	0.000

INDIAN MOUNTAIN SPRINGERVILLE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	15.360	54.698	34.544	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	10.100	90.361	53.878	8.946
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	4.600	32.699	65.692	7.108
ARIS 0	ARISTIDA			
	1.700	11.666	13.006	6.862
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	67.460	717.505	692.176	10.636
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	3.300	27.844	51.004	8.437
COME 1	COWANIA MEXICANA D. DON			
	0.140	0.700	1.406	5.000
CYDA 0	CYNODON DACTYLON L. PERS.			
	38.000	190.000	296.722	5.000
ERAG 0	ERAGROSTIS			
	2.120	10.600	10.938	5.000
ERCU 0	ERAGROSTIS CURVULA SCHRAD. NEES			
	23.700	242.127	242.812	10.216
ERWR 0	ERIOGONUM WRIGHTII TORR.			
	0.080	0.380	0.763	4.750
EUPH 0	EUPHORBIA			
	23.660	158.112	56.643	6.682
HIMU 0	HILARIA MUTICA BUCKL. BENTH.			
	21.100	193.445	251.020	9.168
HYLO 0	HYMENOTHRIX LOOMSII BLAKE			
	1.420	5.901	10.082	4.156
LYPH 0	LYCURUS PHLEOIDES H.B.K.			
	0.900	3.774	7.582	4.193
PHYS 0	PHYSALIS			
	4.500	13.769	19.365	3.059
SELO 0	SENECIO LONGILOBUS BENTH.			
	3.600	4.799	9.643	1.333
SETA 0	SETARIA			
	6.600	33.000	41.551	5.000
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	0.900	5.871	10.514	6.524
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	5.500	55.144	70.146	10.026
URTI 0	URTICA			
	1.900	0.542	0.790	0.285
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.380	2.142	3.454	5.639
ASAR 0	ASTER ARENOSUS(HELLER)BLAKE			
	0.200	0.779	1.566	3.898
SUM 0				
	240.520	1877.865	798.539	0.000

INDIAN MOUNTAIN WHITEHOUSE-LYNX SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	3.320	11.822	11.594	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	0.560	4.182	6.199	7.468
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	20.000	142.170	224.850	7.108
ARIS 0	ARISTIDA			
	21.760	149.328	203.080	6.862
ASTR 0	ASTRAGALUS			
	0.080	0.419	0.661	5.238
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	75.000	959.704	1462.216	12.796
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	302.100	2279.245	454.877	7.544
BOHI 0	BOUTELOUA HIRSUTA LAG.			
	0.100	0.578	1.161	5.780
CYDA 0	CYNODON DACTYLO. L. PERS.			
	17.600	88.000	176.791	5.000
DECO 0	DESMANTHUS COOLEYI EATON TREL.			
	1.500	5.493	6.060	3.662
ERFO 0	ERIGERON FORMOSISSIMUS GREENE			
	1.100	4.253	8.545	3.866
ERWR 0	ERIOGONUM WRIGHTII TORR.			
	0.700	3.325	6.679	4.750
EUPH 0	EUPHORBIA			
	7.980	28.594	11.845	3.583
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	1.640	11.601	18.044	7.074
HYCO 0	HYMENOXIS COOPERI(GRAY)COCKERELL			
	2.760	13.800	15.783	5.000
LOWR 0	LOTUS WRIGHTII A. GRAY GREENE			
	0.040	0.140	0.196	3.500
MUWR 0	MUHLENBERGIA WRIGHTII VASEY			
	16.800	92.753	116.770	5.521
PAOB 0	PANICUM OBTUSUM H.B.K.			
	44.240	244.653	254.282	5.530
PHYS 0	PHYSALIS			
	0.900	2.753	5.532	3.059
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	7.100	71.186	79.541	10.026
SPHA 0	SPHAERALCEA			
	3.860	10.550	12.055	2.733
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.640	3.608	5.659	5.639
VIAR 0	VITIS ARIZONICA ENGELM			
	20.800	12.076	23.303	0.580
ASAR 0	ASTER ARENOSUS(HELLER)BLAKE			
	0.760	2.962	2.699	3.898
SUM 0				
	552.540	4145.902	1537.515	0.000

HELL CANYON GEM SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	4.940	17.591	12.627	3.561
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.960	6.824	9.516	7.108
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	15.240	195.011	124.445	12.796
BOER 0	BOUTELOUA ERIOPODA TORR.			
	0.300	2.664	3.313	8.880
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	0.440	3.712	7.458	8.437
CHAL 0	CHENOPODIUM ALBUM L.			
	0.700	1.369	2.751	1.956
CHVI 1	CHLORIS VIRGATA SWARTZ			
	31.400	264.494	84.866	8.423
CIRS 0	CIRSIUM			
	0.600	3.000	2.401	5.000
DECO 0	DESMANTHUS COOLEYI EATON TREL.			
	1.260	4.614	6.630	3.662
ERWR 0	ERIOGONUM WRIGHTII TORR.			
	8.200	38.950	32.470	4.750
EUPH 0	EUPHORBIA			
	2.020	10.355	10.933	5.126
HIMU 0	HILARIA MUTICA BUCKL. BENTH.			
	24.680	249.386	75.550	10.104
MUTO 0	MUHLENBERGIA TORREYI KUNTH HITCHC.			
	0.200	0.567	1.141	2.839
PAOB 0	PANICUM OBTUSUM H.B.K.			
	7.560	62.204	54.892	8.228
PHYS 0	PHYSALIS			
	2.700	8.261	16.598	3.059
POOL 0	PORTULACA OLERACEA L.			
	4.960	30.164	33.408	6.081
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	5.080	33.142	29.531	6.524
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	70.280	319.138	107.888	4.540
ASAR 0	ASTER ARENOSUS(HELLER)BLAKE			
	9.360	36.489	31.710	3.898
SUM 0				
	190.880	1287.944	129.484	0.000

HELL CANYON TORTUGAS SOIL

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO	0	AMARANTHUS POWELLII WATS.			
		0.700	2.492	4.293	3.561
ANGR	0	MISCELLANEOUS ANNUAL GRASS			
		0.700	5.227	3.462	7.468
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		3.440	24.453	18.220	7.108
ARFE	1	ARISTIDA FENDLERIANA STEUD.			
		0.000	0.000	0.000	6.862
ARIS	0	ARISTIDA			
		0.120	0.823	1.157	6.862
BOCU	0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
		26.140	391.237	134.356	14.967
BOER	0	BOUTELOUA ERIOPODA TORR.			
		15.940	129.445	85.575	8.120
BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.			
		8.480	84.046	53.941	9.911
CIRS	0	CIRSIUM			
		0.020	0.100	0.200	5.000
COME	1	COWANIA MEXICANA D. DON			
		2.800	14.000	15.989	5.000
DECO	0	DESMANTHUS COOLEYI EATON TREL.			
		14.660	53.687	55.181	3.662
EUPH	0	EUPHORBIA			
		0.040	0.205	0.288	5.126
GUSA	0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
		0.020	0.141	0.284	7.074
HIMU	0	HILARIA MUTICA BUCKL. BENTH.			
		3.800	34.838	33.481	9.168
LYPH	0	LYCURUS PHLEOIDES H.B.K.			
		0.980	4.109	6.629	4.193
PANI	0	PANICUM			
		0.320	1.799	2.425	5.624
PAOB	0	PANICUM OBTUSUM H.B.K.			
		0.120	0.794	1.595	6.617
POOL	0	PORTULACA OLERACEA L.			
		0.440	2.675	4.191	6.081
SIHY	0	SITANION HYSTRIX NUTT. J.G. SMITH			
		3.500	22.834	15.964	6.524
SPCR	0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
		4.360	43.714	65.848	10.026
TREL	0	TRIDENS ELONGATUS BUCKL. NASH			
		1.380	4.516	4.692	3.272
TRPI	0	TRIDENS PILOSUS BUCKL. HITCHC.			
		4.560	65.953	60.554	14.463
UNGR	0	MISCELLANEOUS PERENNIAL GRASSES			
		0.360	1.800	2.181	5.000
VIAN	0	VIGUIERA ANNUA JONES BLAKE			
		0.980	5.526	3.195	5.639
SUM	0				
		93.860	894.423	214.466	0.000

WITTY TOM SPRINGERVILLE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	1.360	4.843	8.601	3.561
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.020	0.142	0.285	7.108
ARIS 0	ARISTIDA			
	4.000	27.450	38.795	6.862
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	57.000	555.927	445.071	9.753
CALO 0	CALOCHORTUS			
	48.300	152.645	58.327	3.160
DECO 0	DESMANTHUS COOLEYI EATON TREL.			
	17.540	76.006	64.381	4.333
EUPH 0	EUPHORBIA			
	57.080	118.853	49.829	2.082
HEAN 0	HELIANTHUS ANNUUS L.			
	60.600	124.099	249.316	2.047
HIMU 0	HILARIA MUTICA BUCKL. BENTH.			
	37.020	339.401	241.935	9.168
HYLO 0	HYMENOTHRIX LOOMSII BLAKE			
	40.100	166.665	173.239	4.156
LACT 0	LACTUCA			
	0.800	4.000	8.036	5.000
MIMU 0	MIRABILIS MULTIFLORA(TORR.)A.GRAY			
	0.000	0.000	0.000	5.000
PAOB 0	PANICUM OBTUSUM H.B.K.			
	3.200	21.176	42.542	6.617
PHYS 0	PHYSALIS			
	7.360	22.521	29.213	3.059
POOL 0	PORTULACA OLERACEA L.			
	0.500	3.040	6.108	6.081
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	12.600	82.204	83.638	6.524
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	2.260	22.659	35.484	10.026
SPHA 0	SPHAERALCEA			
	0.220	0.601	0.689	2.733
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.700	3.947	6.057	5.639
SUM 0				
	350.660	1726.182	523.883	0.000

WITTY TOM ALLUVIAL SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO 0	AMARANTHUS POWELLII WATS.			
	4.520	16.096	15.366	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	0.120	0.896	1.018	7.468
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	0.060	0.426	0.484	7.108
ARIS 0	ARISTIDA			
	0.080	0.549	0.866	6.862
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	11.300	144.595	162.122	12.796
BOER 0	BOUTELOUA ERIOPODA TORR.			
	7.000	62.166	93.475	8.880
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	40.260	294.613	136.718	7.317
CHAL 0	CHENOPODIUM ALBUM L.			
	15.460	30.247	32.968	1.956
EUPH 0	EUPHORBIA			
	1.340	6.869	7.459	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.280	1.980	1.906	7.074
HYME 1	HYMENOXYS			
	84.100	536.700	219.828	6.381
LOWR 0	LOTUS WRIGHTII A. GRAY GREENE			
	0.120	0.420	0.714	3.500
MESC 1	MENODORA SCABRA A. GRAY			
	0.320	1.800	2.103	5.625
MUTO 0	MUHLENBERGIA TORREYI KUNTH HITCHC.			
	2.100	5.963	10.876	2.839
PAOB 0	PANICUM OBTUSUM H.B.K.			
	3.200	21.176	42.542	6.617
PHYS 0	PHYSALIS			
	2.000	6.119	9.294	3.059
POOL 0	PORTULACA OLERACEA L.			
	1.300	7.906	6.653	6.081
SAKA 0	SALSOLA KALI L.			
	45.560	274.625	437.076	6.027
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	3.960	25.835	30.739	6.524
SPCO 0	SPOROBOLUS CONTRACTUS HITCHC.			
	4.100	18.367	35.992	4.479
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	26.240	278.726	313.004	10.622
TRPU 0	TRIDENS PULCHELLUS H.B.K. HITCHC.			
	0.020	0.190	0.382	9.513
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	12.020	67.781	105.561	5.639
ASAR 0	ASTER ARENOSUS(HELLER)BLAKE			
	19.120	75.816	63.516	3.965
SUM 0				
	285.080	1883.422	602.936	0.000

WALKER RIMROCK GEM SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	3.540	24.799	28.274	7.005
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	7.820	109.002	117.015	13.938
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	3.800	48.625	61.293	12.796
BOER 0	BOUTELOUA ERIOPODA TORR.			
	3.000	26.642	53.525	8.880
BOUT 0	BOUTELOUA			
	0.060	0.199	0.401	3.333
CHVI 1	CHLORIS VIRGATA SWARTZ			
	2.740	20.615	19.355	7.523
ERWR 0	ERIOGONUM WRIGHTII TORR.			
	3.780	17.955	24.144	4.750
EUPH 0	EUPHORBIA			
	0.660	3.383	4.564	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	0.380	2.688	4.295	7.074
HIBE 0	HILARIA BELANGERI STEUD. NASH			
	38.180	163.409	86.286	4.279
HIMU 0	HILARIA MUTICA BUCKL. BENTH.			
	31.240	206.210	103.032	6.600
MESC 1	MENODORA SCABRA A. GRAY			
	0.200	1.125	2.260	5.625
POOL 0	PORTULACA OLERACEA L.			
	3.280	8.278	8.225	2.523
SPCO 0	SPOROBOLUS CONTRACTUS HITCHC.			
	0.620	2.777	5.579	4.479
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	0.880	8.823	15.395	10.026
TREL 0	TRIDENS ELONGATUS BUCKL. NASH			
	1.980	6.479	13.018	3.272
TRPU 0	TRIDENS PULCHELLUS H.B.K. HITCHC.			
	0.380	3.615	4.330	9.513
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	0.100	0.563	1.132	5.639
SUM 0				
	112.640	726.277	214.455	0.000

WALKER RIMROCK RETRIEVER SOIL

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		0.080	0.568	0.799	7.108
ARIS	0	ARISTIDA			
		10.580	7[illegible].586	65.917	7.333
ASTR	0	ASTRAGALUS			
		0.340	1.780	1.743	5.238
BOCU	0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
		0.040	0.511	1.028	12.796
BOER	0	BOUTELOUA ERICOIDA TORR.			
		6.000	53.285	89.577	8.880
BOUT	0	BOUTELOUA			
		0.060	0.199	0.401	3.333
CRYP	0	CRYPTANTHA			
		1.160	3.737	3.823	3.222
ERCI	1	ERODIUM CICUTARIUM L. L HER.			
		0.020	0.200	0.401	10.000
ERSI	0	ERIOGONUM SIMPONII BENTH.			
		0.760	1.520	1.806	2.000
EUPH	0	EUPHORBIA			
		11.620	52.768	39.338	4.541
GUSA	0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
		0.340	2.405	4.270	7.074
HIBE	0	HILARIA BELANGERI STEUD. NASH			
		0.400	1.711	3.439	4.279
SPCO	0	SPOROBOLUS CONTRACTUS HITCHC.			
		15.080	67.555	67.056	4.479
SPCR	0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
		13.360	133.950	125.784	10.026
STIP	0	STIPA			
		1.200	13.969	28.064	11.641
TREL	0	TRIDENS ELONGATUS BUCKL. NASH			
		12.260	40.123	43.075	3.272
TRPI	0	TRIDENS PILOSUS BUCKL. HITCHC.			
		0.400	5.785	8.902	14.463
TRPU	0	TRIDENS PULCHELLUS H.B.K. HITCHC.			
		1.620	17.549	10.458	10.833
SUM	0				
		75.320	475.210	179.059	0.000

SANDROCK DRAW GEM SOIL

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		1.860	13.221	14.615	7.108
ARIS	0	ARISTIDA			
		19.220	112.116	43.292	5.833
BOCU	0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
		0.900	11.516	14.546	12.796
BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.			
		78.160	1483.037	873.762	18.974
BOHI	0	BOUTELOUA HIRSUTA LAG.			
		65.000	440.870	126.978	6.782
CAST	0	CASTILLEJA			
		4.440	22.200	39.792	5.000
DECO	0	DESMANTHUS COOLEYI EATON TREL.			
		11.560	42.334	34.131	3.662
ERDI	2	ERIGERON DIVERGENS TORR. & GRAY			
		4.700	6.932	5.174	1.474
ERFL	1	ERIGERON FLAGELLARIS A. GRAY			
		0.040	0.200	0.281	5.000
ERFO	0	ERIGERON FORMOSISSIMUS GREENE			
		2.140	9.110	3.978	4.257
ERRA	0	ERIOGONUM RACEMOSUM NUTT.			
		0.900	4.500	7.273	5.000
EUPH	0	EUPHORBIA			
		0.600	3.075	3.342	5.126
GUSA	0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
		0.060	0.424	0.482	7.074
HEAN	0	HELIANTHUS ANNUUS L.			
		0.700	1.433	1.732	2.047
MUWR	0	MUHLENBERGIA WRIGHTII VASEY			
		0.800	4.416	8.873	5.521
POLY	2	POLYGALA			
		0.140	0.700	1.035	5.000
SENE	0	SENECIO NEOMEXICANUS A. GRAY			
		0.640	4.114	3.103	6.428
SIHY	0	SITANION HYSTRIX NUTT. J.G. SMITH			
		35.480	153.875	50.781	4.322
SPIN	1	SPOROBOLUS INTERRUPTUS VASEY			
		0.420	3.871	4.516	8.026
URTI	0	URTICA			
		1.280	0.365	0.233	0.285
SUM	0				
		229.920	2319.296	871.354	0.000

SAND ROCK DRAW HOGG SOIL

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
ANGR	0	MISCELLANEOUS ANNUAL GRASS			
		0.580	4.331	4.046	7.468
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		3.760	26.728	19.609	7.108
ARIS	0	ARISTIDA			
		0.380	2.607	4.072	6.862
BOCU	0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
		0.900	11.516	23.136	12.796
BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.			
		47.640	269.224	99.932	5.651
BOHI	0	BOUTELOUA HIRSUTA LAG.			
		102.200	596.405	129.627	5.835
CARE	0	CAREX			
		0.200	1.000	2.009	5.000
DECO	0	DESMANTHUS COOLEYI EATON TREL.			
		6.700	24.536	25.260	3.662
ERDI	2	ERIGERON DIVERGENS TORR. & GRAY			
		9.760	16.409	19.273	1.681
ERFL	1	ERIGERON FLAGELLARIS A. GRAY			
		0.600	3.000	4.455	5.000
ERFO	0	ERIGERON FORMOSISSIMUS GREENE			
		0.360	1.392	1.035	3.866
ERRA	0	ERIOGONUM RACEMOSUM NUTT.			
		0.480	2.400	3.788	5.000
EUPH	0	EUPHORBIA			
		2.240	15.306	10.329	6.833
GUSA	0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
		0.360	2.546	4.330	7.074
HEAN	0	HELIANTHUS ANNUUS L.			
		0.120	0.245	0.493	2.047
LOWR	0	LOTUS WRIGHTII A. GRAY GREENE			
		0.260	0.910	1.078	3.500
MUWR	0	MUHLENBERGIA WRIGHTII VASEY			
		2.540	14.023	14.722	5.521
POFE	0	POA FENDLERIANA STEUD. VASEY			
		9.960	49.469	52.383	4.966
POLY	3	POLYGONUM			
		0.860	7.166	10.225	8.333
QUGA	0	QUERCUS GAMBELII NUTT.			
		0.120	0.600	1.205	5.000
SENE	0	SENECIO NEOMEXICANUS A. GRAY			
		0.100	0.642	0.760	6.428
SIHY	0	SITANION HYSTRIX NUTT. J.G. SMITH			
		20.480	133.615	94.907	6.524
SPIN	1	SPOROBOLUS INTERRUPTUS VASEY			
		0.400	3.210	6.449	8.026
VETH	0	VERBASCUM THAPSUS L.			
		15.220	72.476	71.333	4.761
SUM	0				
		227.560	1264.945	130.767	0.000

BUCKHEAD MESA SPRINGERVILLE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AGOS 0	AGOSERIS			
	0.180	0.299	0.424	1.666
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	2.920	20.756	23.545	7.108
ARIS 0	ARISTIDA			
	1.000	6.862	8.356	6.862
ASCL 0	ASCLEPIAS			
	0.500	2.500	5.022	5.000
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	20.520	113.384	80.210	5.525
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	21.060	177.697	169.152	8.437
BOHI 0	BOUTELOUA HIRSUTA LAG.			
	19.740	114.112	83.906	5.780
CHAL 0	CHENOPODIUM ALBUM L.			
	0.120	0.234	0.471	1.956
DECO 0	DESMANTHUS COOLEYI EATON TREL.			
	0.140	0.512	1.030	3.662
ERCO 9	ERIOGONUM COGNATUM GREENE			
	0.520	6.066	8.940	11.666
ERFO 0	ERIGERON FORMOSISSIMUS GREENE			
	0.080	0.309	0.434	3.866
ERWR 0	ERIOGONUM WRIGHTII TORR.			
	3.380	16.055	15.519	4.750
EUPH 0	EUPHORBIA			
	26.340	67.025	29.265	2.544
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	2.040	14.733	14.300	7.222
HYLO 0	HYMENOTHRIX LOOMSII BLAKE			
	93.840	447.747	265.986	4.771
LEPI 0	LEPIDIUM			
	0.260	1.040	1.502	4.000
LOWR 0	LOTUS WRIGHTII A. GRAY GREENE			
	0.360	1.260	1.701	3.500
MESC 1	MENODORA SCABRA A. GRAY			
	0.140	0.787	1.208	5.625
PAOB 0	PANICUM OBTUSUM H.B.K.			
	20.660	136.719	128.017	6.617
PENS 0	PENSTEMON			
	3.620	15.399	14.216	4.253
POFE 0	POA FENDLERIANA STEUD. VASEY			
	4.000	19.867	39.913	4.966
SENE 0	SENECIO NEOMEXICANUS A. GRAY			
	1.420	9.128	10.560	6.428
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	8.280	58.448	51.701	7.058
SPCR 0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
	6.440	64.568	75.597	10.026
VETH 0	VERBASCUM THAPSUS L.			
	1.820	8.666	7.488	4.761
ASAR 0	ASTER ARENOSUS(HELLER)BLAKE			
	5.560	21.675	34.860	3.898
SUM 0				
	244.940	1325.857	280.061	0.000

BUCKHEAD MESA BUCKHEAD S[illegible]L

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		2.940	2.[illegible]89[illegible]	16.874	.7.108
ARIS	0	ARISTIDA			
		3.660	2[illegible].116	37.306	6.862
BOCU	0	BOUTELOUA CURTI[illegible]ENDULA MICHX. TORR.			
		58.580	749.593	825.669	12.796
BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.			
		45.000	379.695	391.380	8.437
BOHI	0	BOUTELOUA HIRSUTA LAG.			
		38.540	215.020	166.019	5.579
CHAL	0	CHENOPODIUM ALBUM L.			
		27.700	54.195	79.653	1.956
CRYP	0	CRYPTANTHA			
		0.800	2.577	3.740	3.222
DAST	0	DATURA STRAMONIUM L.			
		16.600	18.259	26.228	1.100
DECO	0	DESMANTHUS COOLEYI EATON TREL.			
		0.720	2.636	5.149	3.662
ERFO	0	ERIGERON FORMOSISSIMUS GREENE			
		0.340	1.314	1.878	3.866
ERIN	1	ERAGROSTIS INTERMEDIA HITCHC.			
		56.200	309.135	302.537	5.500
ERWR	0	ERIOGONUM WRIGHTII TORR.			
		1.800	8.550	10.885	4.750
LYPH	0	LYCURUS PHLEOIDES H.B.K.			
		2.540	10.652	20.214	4.193
MUEM	0	MUHLENBERGIA EMERSLEYI VASEY			
		3.600	14.773	29.679	4.103
PELI	0	PENSTEMON LINARIODES A. GRAY			
		0.600	2.416	3.589	4.027
POFE	0	POA FENDLERIANA STEUD. VASEY			
		12.200	60.595	85.209	4.966
QUTU	0	QUERCUS TURBINELLA GREENE			
		0.140	0.700	1.406	5.000
RHTR	0	RHUS TRILOBATA NUTT.			
		2.240	11.200	22.094	5.000
SENE	0	SENECIO NEOMEXICANUS A. GRAY			
		3.460	22.242	38.761	6.428
SIHY	0	SITANION HYSTRIX NUTT. J.G. SMITH			
		2.700	17.615	23.477	6.524
SPCR	0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
		1.360	13.635	16.547	10.026
SPIN	1	SPOROBOLUS INTERRUPTUS VASEY			
		17.620	141.423	195.375	8.026
STSP	0	STIPA SPECIOSA TRIN. & RUPR.			
		42.200	211.000	234.165	5.000
VETH	0	VERBASCUM THAPSUS L.			
		35.600	169.523	235.132	4.761
SUM	0				
		548.740	3166.960	1309.906	0.000

LONE PINE GEM SOIL

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO	0	AMARANTHUS POWELLII WATS.			
		0.120	0.427	0.526	3.561
ANGR	0	MISCELLANEOUS ANNUAL GRASS			
		0.120	0.896	1.104	7.468
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		8.320	59.143	64.777	7.108
ARIS	0	ARISTIDA			
		1.860	12.764	14.848	6.862
ASCL	0	ASCLEPIAS			
		0.200	1.000	2.009	5.000
BOCU	0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
		50.460	345.737	274.997	6.851
BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.			
		29.920	220.038	55.239	7.354
BOHI	0	BOUTELOUA HIRSUTA LAG.			
		8.260	47.749	31.570	5.780
ERWR	0	ERIOGONUM WRIGHTII TORR.			
		0.500	2.375	3.408	4.750
EUPH	0	EUPHORBIA			
		0.100	0.512	0.530	5.126
GUSA	0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
		0.440	3.112	4.469	7.074
HEAN	0	HELIANTHUS ANNUUS L.			
		5.000	10.239	20.570	2.047
HIJA	0	HILARIA JAMESII TORR. BENTH.			
		5.760	57.635	56.958	10.006
LOWR	0	LOTUS WRIGHTII A. GRAY GREENE			
		0.740	2.590	1.344	3.500
LYPH	0	LYCURUS PHLEOIDES H.B.K.			
		0.980	4.109	6.802	4.193
PAOB	0	PANICUM OBTUSUM H.B.K.			
		0.080	0.529	1.063	6.617
PELI	0	PENSTEMON LINARIODES A. GRAY			
		0.200	0.805	1.618	4.027
PHYS	0	PHYSALIS			
		0.800	2.447	4.917	3.059
POOL	0	PORTULACA OLERACEA L.			
		0.300	1.824	2.709	6.081
PSOR	0	PSORALEA			
		0.600	2.499	5.022	4.166
SIHY	0	SITANION HYSTRIX NUTT. J.G. SMITH			
		0.580	3.784	3.135	6.524
SPCR	0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
		0.800	8.030	14.202	10.026
UNGR	0	MISCELLANEOUS PERENNIAL GRASSES			
		0.360	1.830	3.061	5.000
VIAN	0	VIGUIERA ANNUA [illegible]NES BLAKE			
		0.040	0.[illegible]3	0.453	5.639
ASAR	0	ASTER ARENOSUS(HELLER)BLAKE			
		0.120	0.467	0.795	3.898
SUM	0				
		117.360	792.311	302.550	0.000

LONE PINE SHOWLOW SOIL

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
AMPO	0	AMARANTHUS POWELLII WATS.			
		0.520	1.851	3.577	3.561
ANGR	0	MISCELLANEOUS ANNUAL GRASS			
		0.040	0.298	0.600	7.468
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		2.740	19.477	14.384	7.108
ARIS	0	ARISTIDA			
		2.740	8.259	6.496	3.014
BOER	0	BOUTELOUA ERIOPODA TORR.			
		3.600	31.971	35.868	8.880
BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.			
		25.560	135.104	42.886	5.285
BOHI	0	BOUTELOUA HIRSUTA LAG.			
		13.460	54.519	24.183	4.050
DECO	0	DESMANTHUS COOLEYI EATON TREL.			
		0.900	3.295	4.163	3.662
ERWR	0	ERIOGONUM WRIGHTII TORR.			
		1.320	6.270	4.895	4.750
EUPH	0	EUPHORBIA			
		0.240	1.230	1.000	5.126
GUSA	0	GUTIERREZIA SAROTHRAE (PURSH) BRITT. & RUSBY			
		0.340	2.405	3.081	7.074
HIJA	0	HILARIA JAMESII (TORR.) BENTH.			
		3.740	37.423	64.559	10.006
LOWR	0	LOTUS WRIGHTII A. GRAY GREENE			
		1.800	6.300	9.356	3.500
LYPH	0	LYCURUS PHLEOIDES H.B.K.			
		10.420	37.476	15.839	3.596
MUTO	0	MUHLENBERGIA TORREYI (KUNTH) HITCHC.			
		5.560	16.371	11.784	2.944
PEPA	1	PECTIS PAPPOSA HARV. & GRAY			
		3.260	9.187	8.314	2.818
PHYS	0	PHYSALIS			
		9.140	27.968	21.234	3.059
SEDU	0	SEDUM			
		1.160	0.927	0.927	0.800
SELO	0	SENECIO LONGILOBUS BENTH.			
		0.300	0.399	0.803	1.333
SIHY	0	SITANION HYSTRIX (NUTT.) J.G. SMITH			
		1.680	10.960	16.035	6.524
SPCR	0	SPOROBOLUS CRYPTANDRUS (TORR.) A. GRAY			
		15.980	156.488	86.515	9.792
SPHA	0	SPHAERALCEA			
		9.800	26.786	26.486	2.733
SPIN	1	SPOROBOLUS INTERRUPTUS VASEY			
		5.000	40.131	66.164	8.026
VETH	0	VERBASCUM THAPSUS L.			
		0.060	0.285	0.573	4.761
VIAN	0	VIGUIERA ANNUA (JONES) BLAKE			
		0.040	0.225	0.317	5.639
ASAR	0	ASTER ARENOSUS(HELLER)BLAKE			
		7.160	23.837	13.560	3.329
SUM	0				
		126.560	659.452	148.690	0.000

CARRIZO SPRINGERVILLE SOIL

	FRESH WT	DRY WT	+ OR -	DRY/FRESH
AGDE 0	AGROPYRON DESETORUM(FISCH.)SCHUTT.			
	5.600	31.199	62.680	5.571
AGIN 0	AGROPYRON INTERMEDIUM(HOST)BEAUV.			
	1.200	4.399	8.839	3.666
AMPO 0	AMARANTHUS POWELLII WATS.			
	0.660	2.350	3.637	3.561
ANGR 0	MISCELLANEOUS ANNUAL GRASS			
	2.500	18.671	15.133	7.468
ANWE 0	MISCELLEANEOUS ANNUAL FORBS			
	2.160	15.354	15.043	7.108
BOCU 0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
	32.100	410.753	413.737	12.796
BOGR 0	BOUTELOUA GRACILIS H.B.K. LAG.			
	12.520	105.639	114.605	8.437
DECO 0	DESMANTHUS COOLEYI EATON TREL.			
	0.940	3.442	2.534	3.662
ERCU 0	ERAGROSTIS CURVULA SCHRAD. NEES			
	3.600	36.778	73.888	10.216
ERDI 2	ERIGERON DIVERGENS TORR. & GRAY			
	8.100	13.618	12.119	1.681
ERFL 1	ERIGERON FLAGELLARIS A. GRAY			
	1.000	5.000	10.045	5.000
ERIN 1	ERAGROSTIS INTERMEDIA HITCHC.			
	1.400	7.433	9.734	5.309
ERWR 0	ERIOGONUM WRIGHTII TORR.			
	0.700	3.325	5.102	4.750
EUPH 0	EUPHORBIA			
	14.240	73.001	32.244	5.126
GUSA 0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
	1.040	7.357	11.655	7.074
HYLO 0	HYMENOTHRIX LOOMSII BLAKE			
	166.400	526.488	347.586	3.163
PELI 0	PENSTEMON LINARIODES A. GRAY			
	1.520	6.122	6.474	4.027
PHYS 0	PHYSALIS			
	0.600	1.835	3.688	3.059
POFE 0	POA FENDLERIANA STEUD. VASEY			
	2.300	11.423	16.697	4.966
POOL 0	PORTULACA OLERACEA L.			
	0.220	1.337	2.450	6.081
SIHY 0	SITANION HYSTRIX NUTT. J.G. SMITH			
	14.180	62.255	35.704	4.390
VIAN 0	VIGUIERA ANNUA JONES BLAKE			
	11.020	62.142	52.096	5.639
CEPA 1	CENCHRUS PAUCIFLORUS BENTH.			
	0.300	3.000	3.774	10.000
SUM 0				
	284.300	1412.931	502.765	0.000

CARRIZO RUIN SOIL

		FRESH WT	DRY WT	+ OR -	DRY/FRESH
AGDE	0	AGROPYRON DESETORUM(FISCH.)SCHUTT.			
		8.360	46.577	77.372	5.571
AMPO	0	AMARANTHUS POWELLII WATS.			
		0.640	2.279	4.296	3.561
ANGR	0	MISCELLANEOUS ANNUAL GRASS			
		1.300	9.709	6.318	7.468
ANWE	0	MISCELLEANEOUS ANNUAL FORBS			
		12.640	89.851	53.211	7.108
ARTE	0	ARTEMESIA			
		1.260	6.300	12.049	5.000
BOCU	0	BOUTELOUA CURTIPENDULA MICHX. TORR.			
		77.620	691.195	659.117	8.904
BOGR	0	BOUTELOUA GRACILIS H.B.K. LAG.			
		36.220	305.612	161.841	8.437
CARE	0	CAREX			
		0.020	0.100	0.200	5.000
ERCU	0	ERAGROSTIS CURVULA SCHRAD. NEES			
		22.740	280.450	346.912	12.332
ERDI	2	ERIGERON DIVERGENS TORR. & GRAY			
		17.540	29.489	35.065	1.681
ERIN	1	ERAGROSTIS INTERMEDIA HITCHC.			
		1.120	5.947	8.789	5.309
ERWR	0	ERIOGONUM WRIGHTII TORR.			
		1.220	5.795	11.448	4.750
EUPH	0	EUPHORBIA			
		4.260	21.838	12.676	5.126
GUSA	0	GUTIERREZIA SAROTHRAE PURSH BRITT. & RUSBY			
		2.260	15.987	15.402	7.074
HYLO	0	HYMENOTHRIX LOOMSII BLAKE			
		52.020	216.208	174.599	4.156
PHYS	0	PHYSALIS			
		0.340	1.040	1.855	3.059
POFE	0	POA FENDLERIANA STEUD. VASEY			
		15.300	75.992	90.175	4.966
POOL	0	PORTULACA OLERACEA L.			
		2.440	14.839	24.568	6.081
SAKA	0	SALSOLA KALI L.			
		1.220	7.353	14.528	6.027
SCIR	0	SCIRPUS			
		0.200	1.000	2.009	5.000
SIHY	0	SITANION HYSTRIX NUTT. J.G. SMITH			
		58.180	276.908	113.211	4.759
SPCR	0	SPOROBOLUS CRYPTANDRUS TORR. A. GRAY			
		18.760	188.092	270.895	10.026
TRAG	1	TRAGOPOGON			
		0.400	2.000	4.018	5.000
VETH	0	VERBASCUM THAPSUS L.			
		0.200	0.952	1.913	4.761
VIAN	0	VIGUIERA ANNUA JONES BLAKE			
		0.920	5.187	10.193	5.639
SUM	0				
		337.180	2300.706	728.833	0.000

BABBITT LAKE GEM SOIL	Pounds per Acre
Amaranthus powellii Wats.	14
Aristida	
Three-awn	8
Bouteloua Gracilis H.B.K. Lag.	
Blue grama	1,794
Descurainia pinnati Walt. Britt.	
Pinnate tansymustard	319
Euphorbia	
Spurge	1
Gutierrezia sarothrae Pursh. Britt. & Rusby	
Broom snakeweed	1
Hilaria jamesii Torr. Benth.	
Galleta	45
Hymenoxys richardsonii Hook. Cockerell	
Pinque	1
Lotus wrightii A. Gray Greene	
Red -and-hellow-pea	5
Oryzopsis micrantha Trin. & Rupr. Thurb	
Littleseed ricegrass	14
Portulaca oleracea L.	
Purslane	6
Sitanion hystrix Nutt. J. G Smith	
Bottlebrush squirreltail	75
Miscellaneous perennial grasses	2
Aster arenosus (Heller) Blake	1
Sum	2,285 ± 1,739

BABBITT LAKE TORTUGAS SOIL	Pounds per Acre
Amaranthus powellii Wats.	7
Miscellaneous annual forbs	29
Bahia dissecta A. Gray Britton Ragleaf bahia	10
Boutelous gracilis H.B.K. Lag. Blue grama	735
Descurainia pinnati Walt. Britt. Pinnate tansymustard	49
Gutierrezia sarothrae Pursh Britt. & Rusby Broom snakeweed	1
Hymenoxys acaulis Pursh K. F. Parker Stemless hymenoxys	1
Panicum Panicum	3
Physalis Thorn-apple	46
Poa fendleriana Steud. Vasey Mutton bluegrass	11
Sitanion hystrix Nutt. J. G. Smith Bottlebrush squirreltail	81
Viguiera annua Jones Blake Annual goldeneye	4
Aster arenosus (Heller) Blake	1
Sum	982 ± 221

DOUBLE A SPRINGERVILLE SOIL	Pounds per Acre
Miscellaneous annual grass	1
Miscellaneous annual forbs	1
Aristida	
Three-awn	46
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	96
Bouteloua gracilis H.B.K. Lag.	
Blue grama	547
Desmanthus cooleyi Eaton Trel.	
James bundleflower	15
Eriogonum cognatum Greene	
Wildbuckwheat	2
Euphorbia	
Spurge	32
Hymenoxys Rusbyi(Gray) Cockerell	
Rusbys actinea	76
Panicum obtusum H.B.K.	
Vine-mesquite	1
Penstemon linariodes A. Gray	
Toadflax penstemon	14
Penstemon virgatus A. Gray	
Wandbloom penstemon	1
Physalis	
Thorn-apple	1
Poa fendleriana Steud. Vasey	
Mutton bluegrass	177
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	132
Sporobolus cryptandrus Torr A. Gray	
Sanddropseed	2
Viguiera annua Jones Blake	
Annual goldeneye	65
Sum	1,207 ± 268

DOUBLE A SHOWLOW SOIL

	Pounds per Acre
Aristida	
Three-awn	15
Bouteloua gracilis H.B.K. Lag.	
Blue grama	619
Eriogonum cognatum Greene	
Wildbuckwheat	3
Euphorbia	
Spurge	9
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	1
Hymenoxys Rusbyi (Gray) Cockerell	
Rusbys actinea	3
Lactuca	
Lettuce	1
Panicum	
Panicum	17
Penstemon linariodes A. Gray	
Toadflax penstemon	5
Penstemon virgatus A. Gray	
Wandbloom penstemon	3
Poa fendleriana Steud. Vasey	
Mutton bluegrass	108
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	59
Sum	841 ± 117

BLACK CANYON SPRINGERVILLE SOIL	Pounds per Acre
Agropyron desertorum(Fisch.) Schutt.	
Crested wheatgrass	4
Miscellaneous annual grass	19
Miscellaneous annual forbs	1
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	28
Bouteloua gracilis H.B.K. Lag.	
Blue grama	11
Cirsium	
Thistle	1
Eragrostis curvula Schrad. Nees	
Weeping lovegrass	8
Eriogonum wrightii Torr.	
Wright buckwheat	2
Euphorbia	
Spurge	3
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	2
Koeleria cristata L. Pers.	
Junegrass	4
Menodora scabra A. Gray	
Rough menodora	3
Oryzopsis hymenoides Roem. & Schult. Ricker	
Indian ricegrass	314
Physalis	
Thorn-apple	2
Salsola kali L.	
Russianthistle	82
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	375
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	108
Sphaeralcea	
Globemallow	1
Viguiera annua Jones Blake	
Annual goldeneye	5
Verbena wrightii A. Gray	
Wrights verbena	1
Sum	973 ± 298

BLACK CANYON TORTUGAS SOIL	Pounds per Acre
Miscellaneous annual grass	7
Aristida	
Three-awn	1
Astragalus	
Loco	2
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	537
Bouteloua eriopoda Torr.	
Black grama	154
Bouteloua gracilis H.B.K. Lag.	
Blue grama	11
Ephedra viridis Coville	
Green ephedra	2
Mirabilis multiflora (Torr.) A. Gray	
Wild four-o'clock	3
Oryzopsis hymenoides Roem. & Schult. Ricker	
Indian ricegrass	39
Phlox	
Pholx	2
Physalis	
Thorn-apple	1
Poa longiligula Scribn. & Williams	
Longtongue bluegrass	159
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	41
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	59
Stipa	
Needlegrass	59
Sum	1,080 ± 236

YAMPAI SPRINGERVILLE SOIL	Pounds per Acre
Amaranthus powellii Wats.	2
Miscellaneous annual grass	6
Aristida	
Three-awn	8
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	83
Bouteloua gracilis H.B.K. Lag.	
Blue grama	314
Chenopodium album L.	
Lambsquarters goosefoot	3
Euphorbia	
Spurge	13
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	1
Hilaria mutica Buckl. Benth.	
Tobosa-grass	328
Menodora scabra A. Gray	
Rough menodora	3
Physalis	
Thorn-apple	13
Portulaca oleracea L.	
Purslane	5
Salsola kali L.	
Russianthistle	34
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	94
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	49
Sphaeralcea	
Globemallow	1
Viguiera annua Jones Blake	
Annual goldeneye	2
Sum	958 ± 213

YAMPAI DYE SOIL	Pounds per Acre
Amaranthus powellii Wats.	2
Miscellaneous annual grass	12
Miscellaneous annual forbs	5
Astragalus	
Loco	1
Bouteloua eriopoda Torr.	
Black grama	25
Bouteloua gracilis H.B.K. Lag.	
Blue grama	306
Chenopodium album L.	
Lambsquarters goosefoot	1
Euphorbia	
Spurge	8
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	6
Menodora scabra A. Gray	
Rough menodora	1
Oryzopsis hymenoides Roem. & Schult. Ricker	
Indian ricegrass	181
Physalis	
Thorn-apple	50
Salsola kali L.	
Russianthistle	379
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	77
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	113
Sphaeralcea	
Globemallow	4
Viguiera annua Jones Blake	
Annual goldeneye	7
Sum	1,178 ± 524

INDIAN MOUNTAIN SPRINGERVILLE SOIL	Pounds per Acre
Amaranthus powellii Wats.	55
Miscellaneous annual grass	90
Miscellaneous annual forbs	33
Aristida	
Three-awn	12
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	718
Bouteloua gracilis H.B.K. Lag.	
Blue grama	28
Cowania mexicana D. Don	
Cliffrose	1
Cynodon dactylon L. Pers.	
Bermudagrass	190
Eragrostis	
Lovegrass	11
Eragrostis curvula Schrad. Nees	
Weeping lovegrass	242
Euphorbia	
Spurge	158
Hilaria mutica Buckl. Benth.	
Tobosa-grass	193
Hymenothrix loomsii Blake	6
Lycurus phleoides H.B.K.	
Wolftail	4
Physalis	
Thorn-apple	14
Senecio longilobus Benth.	
Threadleaf groundsel	5
Setaria	
Bristlegrass	33
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	6
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	55
Urtica	
Nettle	1
Viguiera annua Jones Blake	
Annual goldeneye	2
Aster arenosus (Heller) Blake	1
Sum	1,878 ± 799

INDIAN MOUNTAIN WHITEHOUSE-LYNX SOIL	Pounds per Acre
Amaranthus powellii Wats.	12
Miscellaneous annual grass	4
Miscellaneous annual forbs	142
Aristida	
Three-awn	149
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	960
Bouteloua gracilis H.B.K. Lag.	
Blue grama	2,279
Bouteloua hirsuta Lag.	
Hairy grama	1
Cynodon dactylon L. Pers.	
Bermudagrass	88
Desmanthus cooleyi Eaton Trel.	
James bundleflower	5
Erigeron formosissimus Greene	4
Eriogonum wrightii Torr.	
Wright buckwheat	3
Euphorbia	
Spurge	29
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	12
Hymenoxys cooperi (Gray) Cockerell	
Coopers actinea	14
Muhlenbergia wrightii Vasey	
Spike muhly	93
Panicum obtusum H.B.K.	
Vine-mesquite	245
Physalis	
Thorn-apple	3
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	71
Sphaeralcea	
Globemallow	11
Viguiera annua Jones Blake	
Annual goldeneye	4
Vitis arizonica Engelm.	
Grape	12
Aster arenosus (Heller) Blake	3
Sum	4,146 ± 1,538

HELL CANYON GEM SOIL	Pounds per Acre
Amaranthus powellii Wats.	18
Miscellaneous annual forbs	7
Bouteloua curtipendula Michx. Torr. Side-oats grama	195
Bouteloua eriopoda Torr. Black grama	3
Bouteloua gracilis H.B.K. Lag. Blue grama	4
Chenopodium Album L. Lambsquarters goosefoot	1
Chloris virgata Swartz Feather fingergrass	264
Cirsium Thistle	3
Desmanthus cooleyi Eaton Trel. James bundleflower	5
Eriogonum wrightii Torr. Wright buckwheat	39
Euphorbia Spurge	10
Hilaria mutica Buckl. Benth. Tobosa-grass	249
Muhlenbergia torreyi Kunth. Hitch. Ring muhly	1
Panicum obtusum H.B.K. Vine-mesquite	62
Physalis Thorn-apple	8
Portulaca oleracea L. Purslane	30
Sitanion hystrix Nutt. J. G. Smith Bottlebrush squirreltail	33
Viguiera annua Jones Blake Annual goldeneye	319
Aster arenosus (Heller) Blake)	36
Sum	1,288 ± 129

HELL CANYON TORTUGAS SOIL	Pounds per Acre
Amaranthus powellii Wats.	2
Miscellaneous annual grass	5
Miscellaneous annual forbs	24
Aristida	
Three-awn	1
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	391
Bouteloua eriopoda Torr.	
Black grama	129
Bouteloua gracilis H.B.K. Lag.	
Blue grama	84
Cowania mexicana D. Don	
Cliffrose	14
Desmanthus cooleyi Eaton Trel.	
James bundleflower	54
Hilaria mutica Buckl. Benth.	
Tobosa-grass	35
Lycurus phleoides H.B.K.	
Wolftail	4
Panicum	
Panicum	2
Panicum obtusum H.B.K.	
Vine-mesquite	1
Portulaca oleracea L.	
Purslane	3
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	23
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	44
Tridens elongatus Buckl. Nash	
Rough tridens	5
Tridens pilosus Buckl. Hitchc.	
Hairy tridens	66
Miscellaneous perennial grasses	2
Viguiera annua Jones Blake	
Annual goldeneye	6
Sum	894 ± 214

WITTY TOM SPRINGERVILLE SOIL	Pounds per Acre
Amaranthus powellii Wats.	5
Aristida	
Three-awn	27
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	556
Calochortus	
Mariposa	153
Desmanthus cooleyi Eaton Trel.	
James bundleflower	76
Euphorbia	
Spurge	119
Helianthus annuus L.	
Kansas sunflower	124
Hilaria mutica Buckl. Benth.	
Tobosa-grass	339
Hymenothrix loomsii Blake	167
Lactuca	
Lettuce	4
Panicum obtusum H.B.K.	
Vine-mesquite	21
Physalis	
Thorn-apple	23
Portulaca oleracea L.	
Purslane	3
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	82
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	23
Sphaeralcea	
Globemallow	1
Viguiera annua Jones Blake	
Annual goldeneye	4
Sum	1,726 ± 524

WITTY TOM ALLUVIAL SOIL	Pounds per Acre
Amaranthus powellii Wats.	16
Miscellaneous annual grass	1
Aristida	
Three-awn	1
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	145
Bouteloua eriopoda Torr.	
Black grama	62
Bouteloua gracilis H.B.K. Lag.	
Blue grama	295
Chenopodium album L.	
Lambsquarters goosefoot	30
Euphorbia	
Spurge	7
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	2
Hymenoxys	
Hymenoxys	537
Menodora scabra A. Gray	
Rough menodora	2
Muhlenbergia torreyi Kunth Hitchc.	
Ring muhly	6
Panicum obtusum H.B.K.	
Vine-mesquite	21
Physalis	
Thorn-apple	6
Portulaca oleracea L.	
Purslane	8
Salsola kali L.	
Russianthistle	275
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	26
Sporobolus contractus Hitchc.	
Spike dropseed	18
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	279
Viguiera annua Jones Blake	
Annual goldeneye	68
Aster arenosus (Heller) Blake	76
Sum	1,883 ± 603

WALKER RIMROCK GEM SOIL	Pounds per Acre
Miscellaneous annual grass	25
Miscellaneous annual forbs	109
Bouteloua curtipendula Michx. Torr. Side-oats grama	49
Bouteloua eriopoda Torr. Black grama	27
Chloris virgata Swartz Feather fingergrass	21
Eriogonum wrightii Torr. Wright buckwheat	18
Euphorbia Spurge	3
Gutierrezia sarothrae Pursh Britt. & Rusby Broom snakeweed	3
Hilaria belangeri Steud. Nash Curlymesquite	163
Hilaria mutica Buckl. Benth. Tobosa-grass	206
Menodora scabra A. Gray Rough menodora	1
Portulaca oleracea L. Purslane	8
Sporobolus contractus Hitchc. Spike dropseed	3
Sporobolus cryptandrus Torr. A. Gray Sand dropseed	9
Tridens elongatus Buckl. Nash Rough tridens	6
Tridens pulchellus H.B.K. Hitchc. Fluffgrass	4
Viguiera annua Jones Blake Annual goldeneye	1
Sum	726 ± 214

WALKER RIMROCK RETRIEVER SOIL	Pounds per Acre
Miscellaneous annual forbs	1
Aristida	
Three-awn	78
Astragalus	
Loco	2
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	1
Bouteloua eriopoda Torr.	
Black grama	53
Cryptantha	
Hiddenflower	4
Eriogonum simponii Benth.	
Simpsons buckwheat	2
Euphorbia	
Spurge	53
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	2
Hilaria belangeri Steud. Nash	
Curlymesquite	2
Sporobolus contractus Hitchc.	
Spike dropseed	68
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	134
Stipa	
Needlegrass	14
Tridens elongatus Buckl. Nash	
Rough tridens	40
Tridens pilosus Buckl. Hitchc.	
Hairy tridens	6
Tridens pulchellus H.B.K. Hitchc.	
Fluffgrass	18
Sum	475 ± 179

SANDROCK DRAW GEM SOIL	Pounds per Acre
Miscellaneous annual forbs	13
Aristida	
Three-awn	112
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	12
Bouteloua gracilis H.B.K. Lag.	
Blue grama	1,483
Bouteloua hirsuta Lag.	
Hairy grama	441
Castilleja	
Paintbrush	22
Desmanthus cooleyi Eaton Trel.	
James bundleflower	42
Erigeron divergens Torr. & Gray	
Spreading fleabane	7
Erigeron formosissimus Greene	9
Eriogonum racemosum Nutt.	
Redroot buckwheat	5
Euphorbia	
Spurge	3
Helianthus annuus L.	
Kansas sunflower	1
Muhlenbergia wrightii Vasey	
Spike muhly	4
Polygala	
Milkwort	1
Senecio neomexicanus A. Gray	
New-Mexican groundsel	4
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	153
Sporobolus interruptus Vasey	
Black dropseed	3
Sum	2,319 ± 871

SAND ROCK DRAW HOGG SOIL	Pounds per Acre
Miscellaneous annual grass	4
Miscellaneous annual forbs	27
Aristida	
Three-awn	3
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	12
Bouteloua gracilis H.B.K. Lag.	
Blue grama	269
Bouteloua hirsuta Lag.	
Hairy grama	596
Carex	
Sedge	1
Desmanthus cooleyi Eaton Trel.	
James bundleflower	25
Erigeron divergens Torr. & Gray	
Spreading fleabane	16
Erigeron flagellaris A. Gray	
Trailing fleabane	3
Erigeron formosissimus Greene	1
Eriogonum racemosum Nutt.	
Redroot buckwheat	2
Euphorbia	
Spurge	15
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	3
Lotus wrightii A. Gray Greene	
Red-and-yellow-pea	1
Muhlenbergia wrightii Vasey	
Spike muhly	14
Poa fendleriana Steud. Vasey	
Mutton bluegrass	49
Polygonum	
Knotweed	7
Quercus gambelii Nutt.	
Gambel oak	1
Senecio neomexicanus A. Gray	
New-Mexican groundsel	1
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	134
Sporobolus interruptus Vasey	
Black dropseed	3
Verbascum thapsus L.	
Flannel mullein	72
Sum	1,265 ± 131

BUCKHEAD MESA SPRINGERVILLE SOIL	Pounds per Acre
Miscellaneous annual forbs	21
Aristida	
Three-awn	7
Asclepias	
Milkweed	3
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	113
Bouteloua gracilis H.B.K. Lag.	
Blue grama	178
Bouteloua hirsuta Lag.	
Hairy grama	114
Desmanthus cooleyi Eaton Trel.	
James bundleflower	1
Eriogonum cognatum Greene	
Wildbuckwheat	6
Eriogonum wrightii Torr.	
Wright buckwheat	16
Euphorbia	
Spurge	67
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	15
Hymenothrix loomsii Blake	448
Lepidium	
Pepperweed	1
Lotus wrightii A. Gray Greene	
Red-and-yellow-pea	1
Menodora scabra A. Gray	
Rough menodora	1
Panicum obtusum H.B.K.	
Vine-mesquite	137
Penstemon	
Penstemon	15
Poa fendleriana Steud. Vasey	
Mutton bluegrass	20
Senecio neomexicanus A. Gray	
New-Mexican groundsel	9
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	58
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	65
Verbascum thapsus L.	
Flannel mullein	9
Aster arenosus (Heller) Blake	22
Sum	1,326 ± 280

BUCKHEAD MESA BUCKHEAD SOIL	Pounds per Acre
Miscellaneous annual forbs	21
Aristida	
Three-awn	25
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	750
Bouteloua gracilis H.B.K. Lag.	
Blue grama	380
Bouteloua hirsuta Lag.	
Hairy grama	215
Chenopodium album L.	
Lambsquarters goosefoot	54
Cryptantha	
Hiddenflower	3
Datura stramonium L.	
Jimpson weed	18
Desmanthus cooleyi Eaton Trel.	
James bundleflower	3
Erigeron formosissimus Greene	1
Eragrostis intermedia Hitchc.	
Plains lovegrass	309
Eriogonum wrightii Torr.	
Wright buckwheat	9
Lycurus phleoides H.B.K.	
Wolftail	11
Muhlenbergia emersleyi Vasey	
Bullgrass	15
Penstemon linariodes A. Gray	
Toadflax penstemon	2
Poa fendleriana Steud. Vasey	
Mutton bluegrass	61
Quercus turbinella Greene	
Shrub live oak	1
Rhus trilobata Nutt.	
Skunkbush	11
Senecio neomexicanus A. Gray	
New-Mexican groundsel	22
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	18
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	14
Sporobolus interruptus Vasey	
Black dropseed	141
Stipa speciosa Trin. & Rupr.	
Desert needlegrass	211
Verbascum thapsus L.	
Flannel mullein	170
Sum	3,167 ± 1,310

LONE PINE GEM SOIL	Pounds per Acre
Miscellaneous annual grass	1
Miscellaneous annual forbs	59
Aristida	
Three-awn	13
Asclepias	
Milkweed	1
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	346
Bouteloua gracilis H.B.K. Lag.	
Blue grama	220
Bouteloua hirsuta Lag.	
Hairy grama	48
Eriogonum wrightii Torr.	
Wright buckwheat	2
Euphorbia	
Spurge	1
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	3
Helianthus annuus L.	
Kansas sunflower	10
Hilaria jamesii Torr. Benth.	
Galleta	58
Lotus wrightii A. Gray Greene	
Red-and-yellow-pea	3
Lycurus phleoides H.B.K.	
Wolftail	4
Panicum obtusum H.B.K.	
Vine-mesquite	1
Penstemon linariodes A. Gray	
Toadflax penstemon	1
Physalis	
Thorn-apple	2
Portulaca oleracea L.	
Purslane	2
Psoralea	
Scurfpea	2
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	4
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	8
Miscellaneous perennial grasses	2
Sum	792 ± 303

LONE PINE SHOWLOW SOIL	Pounds per Acre
Amaranthus powellii Wats.	2
Miscellaneous annual forbs	19
Aristida	
Three-awn	8
Bouteloua eriopoda Torr.	
Black grama	32
Bouteloua gracilis H.B.K. Lag.	
Blue grama	135
Bouteloua hirsuta Lag.	
Hairy grama	55
Desmanthus cooleyi Eaton Trel.	
James bundleflower	3
Eriogonum wrightii Torr.	
Wright buckwheat	6
Euphorbia	
Spurge	1
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	2
Hilaria jamesii Torr. Benth.	
Galleta	37
Lotus wrightii A. Gray Greene	
Red-and-yellow-pea	6
Lycurus phleoides H.B.K.	
Wolftail	37
Muhlenbergia torreyi Kunth Hitchc.	
Ring muhly	16
Pectis papposa Harv. & Gray	
Chinchweed	9
Physalis	
Thorn-apple	28
Sedum	
Stonecrop	1
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	11
Sporobolus cryptandrus Torr. A. Gray	
Sand dropseed	156
Sphaeralcea	
Globemallow	27
Sporobolus interruptus Vasey	
Black dropseed	40
Aster arenosus (Heller) Blake	24
Sum	659 ± 149

CARRIZO SPRINGERVILLE SOIL	Pounds per Acre
Agropyron desertorum(Fisch.) Schutt.	
Crested wheatgrass	31
Agropyron intermedium (Host) Beauv.	
Intermediate wheatgrass	4
Amaranthus powellii Wats.	2
Miscellaneous annual grass	19
Miscellaneous annual forbs	15
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	411
Bouteloua gracilis H.B.K. Lag.	
Blue grama	106
Desmanthus cooleyi Eaton Trel.	
James bundleflower	3
Eragrostis curvula Schrad. Nees	
Weeping lovegrass	37
Erigeron divergens Torr. & Gray	
Spreading fleabane	14
Erigeron flagellaris A. Gray	
Trailing fleabane	5
Eragrostis intermedia Hitchc.	
Plains lovegrass	7
Eriogonum wrightii Torr.	
Wright buckwheat	3
Euphorbia	
Spurge	73
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	7
Hymenothrix loomsii Blake	526
Penstemon linariodes A. Gray	
Toadflax penstemon	6
Physalis	
Thorn-apple	2
Poa fendleriana Steud. Vasey	
Mutton bluegrass	11
Portulaca oleracea L.	
Purslane	1
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	62
Viguiera annua Jones Blake	
Annual goldeneye	62
Cenchrus pauciflorus Benth.	
Field sandbur	3
Sum	1,413 ± 503

CARRIZO RUIN SOIL	Pounds per Acre
Agropyron desertorum (Fisch.) Schutt.	
Crested wheatgrass	47
Amaranthus powellii Wats.	2
Miscellaneous annual grass	10
Miscellaneous annual forbs	90
Artemesia	
Sagebrush	6
Bouteloua curtipendula Michx. Torr.	
Side-oats grama	691
Bouteloua gracilis H.B.K. Lag.	
Blue grama	306
Eragrostis curvula Schrad. Nees	
Weeping lovegrass	280
Erigeron divergens Torr. & Gray	
Spreading fleabane	29
Eragrostis intermedia Hitchc.	
Plains lovegrass	6
Eriogonum wrightii Torr.	
Wright buckwheat	6
Euphorbia	
Spurge	22
Gutierrezia sarothrae Pursh Britt. & Rusby	
Broom snakeweed	16
Hymenothrix loomsii Blake	216
Physalis	
Thorn-apple	1
Poa fendleriana Steud. Vasey	
Mutton bluegrass	76
Portulaca oleracea L.	
Purslane	15
Salsola kali L.	
Russianthistle	7
Scirpus	
Bulrush	1
Sitanion hystrix Nutt. J. G. Smith	
Bottlebrush squirreltail	277
Sporobolus cryptandrus Torr. A. Gray	
Sand Dropseed	188
Tragopogon	
Goatsbeard	2
Verbascum thapsus L.	
Flannel mullein	1
Viguiera annua Jones Blake	
Annual goldeneye	5
Sum	2,301 ± 729

CONCLUSION

A procedure for computer handling estimated fresh weight and actual dry weight data for study 1705.10 has been established and 1967 field data was processed using this procedure. Minor modifications would allow the programs to be used for other studies with similar data collection procedures.